

# Open Research Online

---

The Open University's repository of research publications and other research outputs

## The Forest of Dean Iron Industry 1st to 4th centuries A.D.

### Thesis

How to cite:

Walters, Bryan (1993). The Forest of Dean Iron Industry 1st to 4th centuries A.D. MPhil thesis The Open University.

For guidance on citations see [FAQs](#).

© 1992 Bryan Walters



<https://creativecommons.org/licenses/by-nc-nd/4.0/>

Version: Version of Record

Link(s) to article on publisher's website:

<http://dx.doi.org/doi:10.21954/ou.ro.0001017e>

---

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

---

[oro.open.ac.uk](http://oro.open.ac.uk)

UNRESTRICTED

THE FOREST OF DEAN  
IRON INDUSTRY  
1st to 4th Centuries A.D.

M.Phil. Thesis, 1992

BRYAN WALTERS

Date of submission: 6 January 1992  
Date of award: 5 January 1993

THE OPEN UNIVERSITY

Faculty of Arts : Classical Studies (Roman Britain)

ProQuest Number:27701222

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 27701222

Published by ProQuest LLC (2019). Copyright of the Dissertation is held by the Author.

All rights reserved.

This work is protected against unauthorized copying under Title 17, United States Code  
Microform Edition © ProQuest LLC.

ProQuest LLC.  
789 East Eisenhower Parkway  
P.O. Box 1346  
Ann Arbor, MI 48106 – 1346

## THE FOREST OF DEAN IRON INDUSTRY 1st to 4th CENTURIES AD

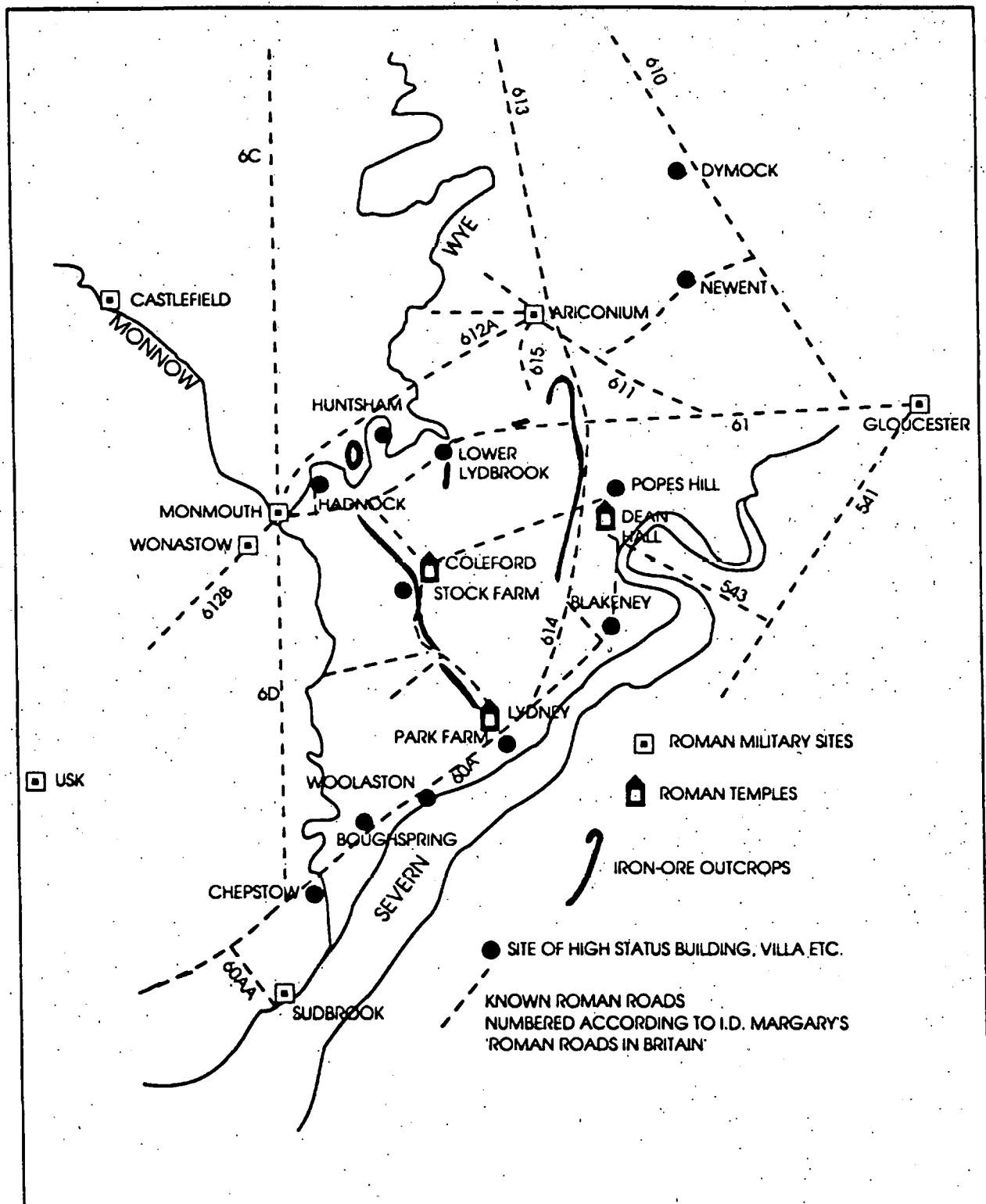
This thesis examines the considerable volume of new archaeological evidence revealed by field survey, aerial survey and excavation in recent years west of the Severn in Gloucestershire, along the lower Wye Valley and in south Herefordshire where it borders Gloucestershire and Monmouthshire.

Without its vast iron resource of rich hematites Roman Dean would have been unremarkable. Its iron industry proved to be central to the development of high status buildings and a sophisticated communications system involving Roman military-constructed roads and its river boundaries, the Severn and the Wye. The thesis is therefore as much about Roman Dean as it is about the iron industry.

Recent evidence has made possible an hypothesis concerning the administration of the industry, not merely that the resources came under state control but that the area was probably an Imperial Estate with the central woodlands reserved as an Imperial Forest for hunting.

There is no longer any doubt that, unlike the Wealden iron industry, Dean ores were moved over sometimes considerable distances to the smelting and smithing sites in and outside of Dean. So were its iron products - in the first century supplying a mainly Roman military market and during the second century a rapidly expanding civilian market.

Estimates are made for iron production and manpower requirements for each of the four centuries under review and evidence is presented for a major recession in the early third century AD which resulted in the closure of some of the largest and oldest iron-working centres and from which the industry never fully recovered during the period of Roman occupation.



## CONTENTS

## PAGE

1.	INTRODUCTION	
2.	ABBREVIATIONS AND GLOSSARY	
3.	MAPS, GRAPHS, PLANS etc. (Location in Text)	
4.	RESEARCH METHODOLOGY	
	ROMAN PERIOD IRONWORKING SITES WITH OPERATING PERIODS	
5.	GAZETTEER OF SITES REFERRED TO IN TEXT	1
6.	THE GEOLOGY OF DEAN	29
6.1	DESCRIPTION	29
6.2	THE COMPOSITION OF DEAN ORES	30
7.	THE GEOMORPHOLOGY OF DEAN	30
7.1	DESCRIPTION AND LOCATION OF ORE OUTCROPS	30
8.	KNOWN TECHNOLOGY OF LOCAL IRON PRODUCTION	34
8.1	ORE EXTRACTION	34
8.2	ORE PREPARATION	35
8.3	ORE SMELTING	36
8.4	RE-WORKING THE BLOOM (Primary Smithing)	38
9.	THE PRE-ROMAN IRON INDUSTRY IN BRITAIN	39
9.1	SUMMARY OBSERVATIONS AND SOME RECENT DISCOVERIES	39
9.2	PRE-ROMAN IRONWORKING AROUND DEAN	40
10.	THE ROMAN IRON INDUSTRY IN AND AROUND DEAN	45
10.1	FIRST CENTURY IRON PRODUCTION FOR THE ROMAN MILITARY	45
10.2	ARICONIUM	47
10.3	SUPPLEMENTARY SMELTING AT VILLAGE SITES IN DEAN?	53
10.4	BLESTIUM - MONMOUTH	58
10.5	WEST OF WYE FIRST CENTURY IRONWORKING SITES	62
10.6	A CHANGE OF ADMINISTRATION IN THE FLAVIAN PERIOD?	66
10.7	AN EARLY FLAVIAN BUILDING OF HIGH STATUS AT BLAKENEY	67
10.8	LATER FIRST CENTURY DEVELOPMENTS	72
10.9	SOME PROBABLE REASONS FOR ADMINISTRATIVE CHANGE	72
11.	DEAN IRON INDUSTRY IN THE SECOND CENTURY AD	76
11.1	SECOND CENTURY EXPANSION	77
11.2	ARICONIUM	77
11.3	BLESTIUM - MONMOUTH	78
11.4	SOUTH HEREFORDSHIRE IRONWORKING SITES WEST OF THE WYE	80

11.5	A MAJOR NEW IRONWORKING SETTLEMENT AT NEWENT	82
11.6	DWELLINGS OF HIGHER STATUS AND THEIR LOCATION	84
11.7	SUMMARY OF PROBABLE REASONS FOR SECOND CENTURY EXPANSION	90
12.	THIRD CENTURY DECLINE IN THE DEAN IRON INDUSTRY	93
12.1	CLOSURE OF MAJOR IRONWORKING SITES	93
12.2	REVIEW OF SECOND CENTURY PRODUCTION	93
12.3	NEWENT - A CIVILIAN ENTREPRENEURIAL ENTERPRISE?	102
12.4	FROM DECLINE TO A MODEST STABILITY	103
12.5	THE END OF THE OLD AND THE BEGINNING OF A NEW CENTURY	108
13.	THE FOURTH CENTURY IN WYE/DEAN	110
13.1	AN IMPRESSION OF OCCUPATION AND ACTIVITY	110
13.3	THE END OF AN ERA - THE LATE FOURTH CENTURY	124
14.	POST ROMAN DEAN	125
15.	AN ASSESSMENT OF THE EXPLOITATION OF DEAN'S IRON AND TIMBER RESOURCES FIRST TO FOURTH CENTURIES AD	127
15.1	THE EXPLOITATION OF DEAN'S IRON RESOURCES	127
16.	THE EXPLOITATION OF DEAN'S TIMBER	128
17.	MANPOWER AND THE IRON INDUSTRY	132
17.1	THE ORE-SMELTING INDUSTRY	132
17.2	THE ORE-MINING INDUSTRY	134
17.3	THE CHARCOAL INDUSTRY	134
17.4	TRANSPORTATION AND THE IRON INDUSTRY	135
18.	TRANSPORTATION AND COMMUNICATION	135
18.1	AVAILABLE METHODS	135
18.2	WYE/DEAN'S ROADS AND PORTS IN ROMAN TIMES	140
19.	THE DISTRIBUTION OF CRUDE ORE	144
19.1	DISTRIBUTION FROM VILLA SITES	145
20.	ADMINISTRATION OF THE IRON INDUSTRY	146
21.	SUMMARY OF THE EVIDENCE	150

## BIBLIOGRAPHY

154

## 1. INTRODUCTION

This thesis brings together the considerable volume of new archaeological evidence revealed by field survey, aerial survey, mines' research and excavation in recent years in Dean, south Herefordshire and in Monmouthshire where it borders the Wye Valley. It also examines previously published archaeological material and antiquarian observations about the ancient iron industry of the region.

Without its vast iron and timber resources Roman Dean would have been unremarkable. Its iron industry was central to the development of high status buildings and a sophisticated communications' system.

Unlike the Wealden iron industry, Dean ores were moved over sometimes considerable distances to smelting and smithing sites in and outside of Dean. So were its iron products - in the first century AD supplying a mainly Roman military market, and during the second century a rapidly expanding civilian market.

Who controlled Dean's resources and how the region was administered is still unclear, however, the available information offers circumstantial evidence which is discussed herein.

It has been possible to offer tentative estimates of the quantities of ore which were mined and then smelted on a few major ironworking sites. Until more experiments have been undertaken in smithing iron blooms smelted in reconstructions of Roman-type furnaces, it has been considered prudent not to offer estimates of the amount of smithed iron that was produced and eventually forged into artefacts. Results from the few experiments that have been published are so widely variable that any estimate offered in this study would be nothing more than speculation.

I wish to acknowledge the investigative archaeological work undertaken over many years by members of Dean Archaeological Group, The Forest of Dean Local History Society, Monmouth Archaeological Society and the Archaeological Section of the Woolhope Field Club. Specific acknowledgement must be made of my indebtedness to Professor Peter Salway and Dr. Henry Cleere who have patiently and helpfully guided me through this project and to Dr. C. Emlyn-Jones whose very kind support has been much appreciated. I am also most grateful that Professor W. H. Manning and Dr. T. Potter caused me to reconsider much of what I had prepared in an earlier draft.

Bryan Walters 1992  
Forest of Dean.



## 2. ABBREVIATIONS AND GLOSSARY

BAR	British Archaeological Reports, Oxford.
BB1	Black Burnished pottery from Dorset sources.
BGAS	Bristol & Gloucs. Archaeological Society.
CBA	Council for British Archaeology.
DAG	Dean Archaeological Group.
FoD	Forest of Dean.
GADARG	Gloucester & District Archaeological Research Group.
GRO	Gloucestershire Record Office.
Hist.Met.Soc.	The Historical Metallurgy Society.
HMSO	Her Majesty's Stationery Office.
IA	Iron Age.
Inst.	Institute.
J.	Journal.
LHS	Local History Society.
MAS	Monmouth Archaeological Society.
Num.Chron.	Numismatic Chronicle.
Pers. Comm.	Personal Communication.
PRO	Public Record Office (London).
R-B	Romano-British.
SVW	Severn Valley Wares.
Trans.	Transactions. Sometimes: Translated (by).
WNFC	Woolhope Naturalists Field Club (Herefs.)

## GLOSSARY

**FIELD SURVEY** - Is here defined, along with fieldwalking, as indicating the total survey of a ploughed field surface with retrieval of all visible artefactual evidence. It includes the precise recording of the location and extent of occupation/activity areas. Extensive areas are usually gridded i.e. divided into 10 metre grids from a base-line which is tied into an Ordnance Survey grid line when possible so that precise grid references can be given for each 10 metre area.

**FORGING** - The final part of the ironworking process during which iron is heated up and wrought into shape by hammering on an anvil. Also referred to in the text as **SECONDARY SMITHING**.

**HAND-SMITH** - A local name for the person who forges iron. Now known as a blacksmith.

**IRON BAR** - A typical Roman shape was a square sectioned, rectangular piece of iron ready for forging. Average weight around 2½ lbs.

**IRON BILLET** - A rough block of partially compacted iron in an intermediate stage of manufacture between a raw bloom and a forgeable bar of iron.

**IRON BLOOM** - The mass of iron produced in a furnace as a result of the reduction (smelting) of iron ore. Pure iron melts at 1535 C. but bloomery iron has not normally been heated above about 1250 C. A bloom contains impurities and requires further processing before it can be forged.

**IRON BUN** - Similar to an iron bar but of circular shape about 11-13cm in diameter and 4cm thick weighing about 4½-5½ lbs. Several have been found in Dean but not in datable contexts.

**NATIVE-WARES** - In this study 'Native-Ware' is used to describe the black/dark grey fabric cooking pots and storage jars made by the native Britons before, and for a while after, the Roman occupation of the region. They are usually hand-made and thick walled. Bead-like rims were common but a wide variety of rim forms are known. The body of the pot was usually much wider than the diameter of the rim. Some are sparsely decorated with incised or impressed designs.

**ORE-SMITH** - A local name referring to the person/s who smelted the ore in a furnace.

**PRIMARY SMITHING** - The act of hammering the raw bloom, once removed from the furnace, to remove adhering and entrapped slag impurities. This was continued through the billet stage until shaped into a bar ready for forging.

**SEVERN VALLEY WARES (SVW)**- The distinctive pottery, usually of orange fabric with a grey core (grey fabrics are not uncommon), that was manufactured in a number of centres throughout the Severn Valley from 1st to 4th centuries AD. There is growing evidence that it was first made prior to the Roman invasion. First century Severn Valley Wares are referred to in this study as 'Early Severn Valley Wares'. They usually had a gritty fabric whereas during the main production period, from 2nd to 4th centuries, there was a preference for a virtually inclusion-free fabric which was frequently burnished smooth.

**SCOWLES** - The local name for the bowl-shaped hollows created by the removal of ore which outcrops on the ground surface. They frequently link up into long, sinuous, ditch-like features with pillars of limestone left standing from around which ore has been removed.

**SECONDARY SMITHING** - The same as forging.

**SLAG** - A fluid mixture of iron and gangue minerals which separate from the bloom and exit via a tap-hole through the lower wall of a Roman-type furnace once the temperature has reached c.1250 C.

**TUYERE** - The hole, usually with a clay surround, through which the bellows blow air into a furnace.

### 3. MAPS, GRAPHS, PLANS etc. (Location in Text)

	Between Pages
Map of Roman Dean	Frontispiece
Roman Period Ironworking Sites with Operating Periods	Preface
Map of Parishes Listed in Gazetteer	Preface
Geological Map of the Forest of Dean	28/29
Sectional Map of Geological Strata in Dean	28/29
Principal Ore Sources	31/32
Roman Military Sites	44/45
Ariconium Plan	46/47
Magnetometer Survey of Military Site	46/47
Plan of Excavation 1989	46/47
Ditch Sections	46/47
First Century Ironworking Sites	57/58
Second Century Ironworking Sites	76/77
Plan of Second Century Ironworking Settlement at Newent	81/82
Third Century Iron Production Sites	103/104
Fourth Century Iron Production Sites	109/110
Relationship of High Status Residences to Ore Outcrops	145/146

#### **4. RESEARCH METHODOLOGY**

My research into the Forest of Dean iron industry of the Roman period began in 1983 when I took up residence in the area.

Initial research was a familiarisation process, learning the geology of Dean, visiting iron ore sources and studying all published material concerning the industry along with excavation, field survey and antiquarian reports relating to Roman sites in West Gloucestershire, South Herefordshire and Monmouthshire.

#### **IRON PROCESSING SITES**

Of the twenty-six confirmed Roman-period iron-working sites listed overleaf, sixteen were known before my researches began. Ten more have been located since 1983. Several more sites are known where visible iron-slag remains have nearby or associated Romano-British artefacts, usually pottery fragments, but the iron-working phase cannot be assigned with total confidence to a period of Roman occupation. Some of these are listed in the Gazetteer but are not discussed at length in the text.

Five of the twenty-six sites are beneath towns, villages or housing developments and new information can only be gained by excavation or observation of land disturbance. Eight of the sites reported before 1983 are now beneath unploughed pastureland. Thirteen sites are located on regularly ploughed areas.

Six of the sites can be described as major in that the Roman slag remains cover several acres. They are: Ariconium, Coleford, Newent, Monmouth, Overmonnow and Whitchurch. The extent of the slag remains in Coleford, Monmouth, Overmonnow and Whitchurch have been determined by excavations and observation of land disturbance over many years, however not all of these slag deposits originated during the Roman period. Roman slags are frequently overlain by those produced by

Medieval ironworking. Ariconium and Newent are regularly ploughed and the ironworking debris contains no post-Roman or Medieval material.

Four excavations have been conducted at Ariconium, only one of them in recent years. Two areas of Ariconium have been gridded with a total surface retrieval of artefacts. In 1987 members of Dean Archaeological Group along with members of the Archaeological Section of the Woolhope Club gridded a total of 7500 square metres. In 1989 Archaeology students from the Royal Forest of Dean College gridded a total of 8400 square metres. Slags were weighed and analysed. In 1987 the grids were 25m square and in 1989 10 metres square. Search time allowed within each grid was consistently the same.

Every metre of Ariconium has been meticulously walked every year since 1984. Slag areas have been measured and their density discerned when possible. The position of datable finds has been triangulated and grid referenced. Aerial photography has been employed to confirm the spread of iron-working debris.

The main iron-working area at Newent is concentrated over virtually the whole of a fourteen-acre field. Surface pottery remains are profuse, consistently of 2nd century form and mostly manufactured on site. The whole area has also been recorded by aerial photography.

All of the other eleven regularly ploughed sites are relatively small with concentrations of slag covering from 600 to 2000 square metres. These are easily assessed and plotted without gridding. All have produced quantities of closely datable Romano-British pottery of restricted production periods to the exclusion of pottery from later bloomery periods.

Of the ten sites discovered since 1983 four have received confirmatory excavations.

## ORE SOURCES

Outcrops of iron-ore-bearing limestones are to be found on the northern, eastern and western sides of the Forest of Dean. On the western side they extend down to Lydney, the southernmost point. All major outcrops have produced nearby and associated Roman-period artefacts including coin hoards, single coins and pottery. Three major outcrops have known associated Roman buildings in close proximity.

All ore sources have been personally visited on numerous occasions. All twenty-six iron-working areas have been studied, including the ones now under pasture, and I have been involved in recent excavations on six of them.

**ROMAN-PERIOD IRONWORKING SITES IN THE FOREST OF DEAN AND WYE VALLEY  
AND THEIR PROBABLE OPERATING PERIODS.**

ARICONIUM	From mid-1st century to end of 2nd century.
COLEFORD	Possibly 1st century. Mainly 2nd to 4th.
SYMONDS YAT	1st century.
RUARDEAN	1st century.
GREAT HOWLE	1st century.
DRYBROOK	1st century.
HUNTLEY	1st century.
ASTON INGHAM	1st century.
TRELLECH	1st century.
HYGGA	1st century.
GREAT CRUMBLAND	1st century.
LOWER MONKTON	1st century.
WELSH NEWTON	1st & 2nd centuries.
MONMOUTH	Later 1st and 2nd centuries.
NEWENT	2nd century.
WHITCHURCH	2nd century.
LORDS WOOD	1st/2nd century (not determinable)
TRE-ADDOW	1st/2nd century (not determinable)
TRETIRE	1st/2nd century (not determinable)
BLAKENEY	Source and date of slags not yet determined but 1st/2nd century.
OVERMONNOW	3rd and 4th centuries.
HADNOCK	Possibly 2nd century.
WOOLASTON	Later 3rd century.
POPE'S HILL	Probably 2nd/3rd century. Not closely dated.
ENGLISH BICKNOR	4th century.
HANGERBURY	4th century.

A number of small close-to-Severn 4th century sites have recently been discerned.





**5. GAZETTEER OF SITES REFERRED TO IN TEXT**

### ASTON INGHAM CP (Herefs.)

(G1) SO 6905 2350 - Localised iron ore in Wenlock Limestone. Recorded as mined by Foley family in 17th/18th century. Quarry ditches still visible (Foley MSS. Hereford Record Office; Johnson BLC. 1953; Bick D. 1987). No evidence that it was mined in the Roman period.

(G2) ROMAN COIN HOARD (SO 684 240)

'a deposit of many thousands of coins in two chests ready for transport - Maximianus to Constantius II'. Found in 1855 (Watkin WT. 1877).

(G3) SO 681 239 - 1st century early SWW pottery with associated bloomery slags recorded during recent field survey. Also copper-rich slag.

### AWRE CP

(G4) BLAKENEY (SO 673 069)

Later 1st to early to mid-2nd century high status building. Smelting and primary smithing slags as hard-core (Walters M. 1990 & 1992).

(G5) SEVERN BEACH - WHITESCOURT (SO 706 073)

Bloomery furnace slag and primary smithing slag in abundance on beach and in eroding bank as hard-core below sandstone paving. Pottery mixed in with slag mainly 4th century but some 3rd century material present. One late IA Native-Ware rim. These would all appear to have been re-deposited (Allen JRL. 1986; Allen JRL. and Fulford MG. 1987).

### BLAISDON CP

(G6) WELSHBURY HILL FORT (SO 6780 1545)

Iron, Roman-type spear/javelin head found in ditch of outer rampart.

### CHURCHAM CP

#### (G7) BULLEY BENCH WOOD (SO 762 203)

Iron slag, Roman brooch and bronze statue recorded as having been found at this point (O.S. unpublished records). Present whereabouts of artefacts unknown.

### CINDERFORD CP

#### (G8) CINDER FORD (SO 6500 1265)

On reputed Roman road from Littledean to Monmouth via Coleford. Traces of paved road with revetted kerbing noted in eight places between Littledean and Cinder Ford Bridge (1½ miles) and in a further eight places before Speech House. It was also observed between Speech House, Cannop, Howlers Slade and Broadwell. The road was recorded as being 13 feet 7 inches wide (Bellows J. 1899; Hart C. 1967).

#### (G9) CRABTREE HILL (SO 63 13)

c500 coins discovered in a hoard around 27th August 1839 by a man 'who was employed to raise some stones in Crabtree Hill, of which several heaps were lying on the surface; in turning over the stone found about 25 Roman coins. The next day, in another heap about 50 yards distant, he found a broken jar or urn of baked clay, and about 400 or 500 coins lying by it, the coins being for the most part those of Claudius II, Gallienus, Victorinus etc...' The Hill is on coal outcrops (Nicholls HG. 1858).

### COLEFORD CP

#### (G10) COLEFORD (SO 575 107)

The town overlies massive and extensive bloomery slag (tapped and untapped) and smithing slag deposits which emanated mainly from iron-working in the Roman and Medieval periods. Some recorded, buried deposits are 3 metres thick. They extend along at least three roads to some distance from the town centre - southwards up Cinder Hill, north-

west along the Staunton road and south-west along the Newland road (Standing LJ. 1985; Standing LJ. 1987; Miss Mushet in Hart C. 1983).

Two major scowle areas lie within one mile of the town (See SCOWLES VILLAGE and NEWLAND CP, PERRYGROVE).

(G11) COALPIT HILL (SO 562 130)

Situated on the northern boundary of the parish. Coal, associated with a mid-1st/2nd century Roman iron-working site in Monmouth, was extracted from surface workings in this vicinity, which extend for some distance eastwards. Coal from the High Nash site has also been identified as emanating from this locality (Walters B. 1988; Williams V. 1988).

(G12) SCOWLES VILLAGE (SO 5630 1075)

Located on the 700 feet (213m) contour, less than one mile west of Coleford. Scowles extend for some 400 metres but within a rather narrow strip. A number of Roman coin finds were reported by a local resident (Pers. Comm.) from Badger's End, formerly The Hollies at SO 5645 1056 (Grover JW. 1873; Fryer WH. 1886).

(G13) HIGH NASH (SO 5777 1012)

A late Iron Age and Romano-Celtic temple/sanctuary complex associated with a nearby iron-workers settlement. Two iron horse-shoes were among the ritual dedicatory deposits. Two large lumps of unburnt coal were sealed below a late Roman altar base.

Two 3rd/4th century coin hoards have been found close to the site and several more single coins of the 2nd to 4th centuries were found during rescue excavations in 1986/87. Within the projected temenos area a ritual burial was excavated. Dr. Graham Webster reported: 'There seems a strong presumption that the Coleford burial was that of a Celtic Warrior' (Britannia 1990, XXI). Finds included three bronze

rings from a baldric, one with a richly enamelled stud of unique late La Tène design, the remains of an iron circular shield boss and an iron sword, bent double.

Tapped and untapped bloomery slag was freely used as hard-core throughout the site. A residual dump of crushed iron-ore was located 70 metres SSW of the temple with heavy slag deposits some 50 metres further away (Walters B. Forthcoming 'Rescue Excavation at High Nash, Coleford').

Coleford By-Pass (Tufthorn Lane, High Nash). The ground was cleared for the new by-pass in 1991. Bloomery slag, building foundation stones and associated R-B pottery were noted at SO 5772 0995.

#### DRYBROOK CP

(G14) DRYBROOK (SO 6355 1790)

Copse with a long-disused scowle. Ground flora includes wood anemone, primrose and dog's mercury (indicators of ancient woodland - see Rackham O. 1986) in topsoil accumulated over the hollowed out ore outcrop. Local residents report several other scowle holes immediately to the north which were filled in during the 1960s. 1st century AD early Severn Valley Ware storage jar rim from nearby gas pipe-line disturbance. Small square and rectangular enclosures adjacent to the scowles. A 4lb bun-shaped, smithed iron ingot was found at SO 6380 1824 of unknown date.

The Oxford Excavation Unit did trial excavations in April 1989 on behalf of ARC who were planning to extend their nearby limestone quarry into the area. R-B pottery was located in five of their trenches along with late Iron Age form Native-Ware sherds. (Oxford Assessment Report made available to B.Walters by ARC local management). The filled in scowles show on DAG aerial photograph 9/6-7 taken 2.7.89. Permission has since been granted for the quarry to be extended and the above features will be destroyed.

ENGLISH BICKNOR CP

(G15) HANGERBURY HILL - A ridge of Lower Dolomite which stretches a little more than  $1\frac{1}{2}$  miles from the Wye at Lower Lydbrook in a southerly direction. On its east side it dips steeply, in places precipitously, into the Lydbrook valley. To the west its slope is more gradual to the valley bottom (Brooks Head Grove) where a brook is interrupted by descents into swallow holes in the Lower Limestone shales. There are ore bearing Crease Limestone outcrops on the top of Hangerbury Hill. There is an OS Trig. Point at 736 feet.

At its northern end ore has been quarried from the surface of the Dolomite and may still be picked up. This lies within a prehistoric enclosure; traces of the earthworks still being visible, as are rectangular stone field boundaries on its western slope. Ore is also to be picked up from the fields to the west of its southern tip around Carter's Piece, again from the Dolomite. Rectangular enclosures are to be observed on aerial photographs (Ref: DAG Aerial Survey 9/10-18 2.7.89).

(G16) BARNFIELD (SO 59395 15161)

The first Romano-British shaft type smelting furnace to be excavated in the Forest of Dean was recorded here in 1987 - see 13.1 (Walters B & M. 1987). Several other smelting areas are in the same field. Surface small finds date from the late Iron Age to the 4th century AD (Walters B. 1985; 1986; 1987).

(G17) HANGERBURY (SO 5960 1565)

Square section forgeable bar of iron (a typical Roman type) came from this field. It weighed  $2\frac{1}{2}$  lbs. Associated pottery was a Central Gaulish plain samian sherd, BB1 and SVW.

(G18) THE MOUNT, LOWER LYDBROOK (SO 5935 1645)

1st to 4th century AD enclosed occupation site on promontory. A small exploratory excavation within the enclosure produced smelting and smithing iron slag, and a slag that was 70% limonite and 30% malachite. Also foundry dross from the melting of copper and lead alloys in a ferruginous matrix (Walters B. 1985; King RJ. 1990; Tylecote R.F. 1985).

(G19) CINDER HILL (SO 586 147)

Huge deposits of bloomery furnace slag still visible set in a steep bank close to a brook. Named 'Cinder Hill' on a 1608 map. Aerial photographs show a trackway and probable buildings. No dating evidence yet.

(G20) COWMEADOW FARM (SO 579 154)

R-B pottery sherds with a bloomery slag concentration close to the N edge of the field. A partly smithed iron billet with square section was found here. Weight about 2½ lbs. (one end had been shaped into a bar, the other was still a rough mass). Pottery dating evidence is all 3rd/4th century including Oxfordshire colour-coated mortarium, a BB1 flanged bowl and SVW storage jar.

(G21) SYMOND'S YAT HILL FORT (SO 5635 1580)

Bloomery smelting slag and 1st century Severn Valley Ware pottery noted in section to bedrock lifted by a fallen tree in the gales of January 1990. Associated with Pennant sandstone paving. Subsequent excavations by the Gloucestershire County Archaeology Unit later the same year and in 1991 produced similar finds along with 1st century AD late Iron Age type Native-Wares in black fabric. The evidence suggests smelting within the fort after the Roman occupation of the Forest in the mid-1st century AD (Walters B & M. 1989).

GOODRICH CP (Herefs.)

(G22) HUNTSHAM VILLA - A winged-corridor Roman villa with nearby aisled barn and native enclosures of earlier date. Villa 2nd to 4th

century (BRIDGEWATER NP. 1962, & 1965); DAG Aerial Survey: 1/26-29, 18.6.89 and 10/4-10, 2.7.89.).

After Bridgewater's death most of the finds were deposited with Hereford Museum. No final excavation report was published. In an attempt to rectify the situation, Elizabeth Taylor of WNFC has been re-assessing the evidence with publication in mind. It would seem that 1st. century AD, pre-Roman smelting took place within the native enclosure. There is very little evidence for Roman period iron-working.

#### HENTLAND CP (Herefs.)

'Recently slag deposits have been noted here. A slag-surfaced road was found near the church, and this is on the alignment of a suggested Roman road from Red Rail (Rhyd yr heol - Ford of the Road). This district has yielded several Roman and Medieval pottery finds recently' (Bridgewater NP. 1968. See also: Wright T. 1854; Hale MB & Moore LP. 1970; Taylor E. 1986).

#### (G23) TRE-ADDOW (SO 5405 2375)

Rectangular features and boundary ditches identified in DAG Aerial Survey 12/26-33 18.7.89. Subsequent fieldwalking produced R-B pottery sherds, mainly SWW. Very dense bloomery slag deposits at SO 5411 2376 close to road with associated R-B pottery sherds but nothing to enable specific dating of site.

(G24) SO 529 244 - Wide spread of black soil with much bloomery slag and R-B pottery. Probable smelting site. Close to boundary with Tretire Parish. No specific dating given for pottery finds. (Bridgewater NP. 1969).

#### HUNLEY CP

#### (G25) ROUND HILL (SO 7215 1855)

Bloomery slag, baked clay, 1st century AD SWW pottery and limestone-



tempered late Iron Age type Native-Ware. The site is elevated, 200 metres north of the Roman military road from Gloucester (Kingsholm) to Mitcheldean and in the triangle where the road to Ariconium forks right from the Mitcheldean road. The site is on top of the hill facing south. Clay extraction pits are visible on aerial photographs (DAG Aerial Survey 4/1-6 24.6.89).

#### KENTCHURCH CP (Herefs.)

##### (G26) CASTLEFIELD (SO 4275 2370)

Claudio-Neronian fort site. A section was excavated through one ditch into the interior by members of Monmouth Archaeological Society in the summer of 1986. Smithing slag on site. Well stratified, corroded iron spear-head revealed by X-Rays (See DAG Aerial Survey photographs 7/26-32; 8/0-2; Report forthcoming from Clarke S and Jackson R.).

#### LITTLEDEAN CP

(G27) LITTLEDEAN (SO 673 140) Heavy bloomery slag deposits and a 4 lb forgeable iron 'bun' of unknown date from this field. The 'bun' is identical to the one from Drybrook and similar to one from Edgehills.

##### (G28) DEAN HALL (SO 6727 1307)

Late Iron Age to 5th century Romano-Celtic shrine. Massive slag deposits in grounds, smelting and smithing waste. Some forging waste has been confirmed as Medieval. No proof yet of Roman smelting. (Jones B. & Mattingly D. 1990).

A section of paved Roman road running through the grounds was discovered and excavated by DAG in 1991/92 (Dean Archaeology 4, 1991).

##### (G29) POPES HILL (SO 6833 1458)

Hut remains with paved floor on Chestnuts Hill. Pottery included Central Gaulish samian and Oxfordshire colour-coated ware. A nearby well was probably in use during the Roman period. Not far away, but further down the slope of Chestnuts Hill, the remains of a large

timber structure were excavated, 22 feet long and 9 feet wide. Surrounding it, at the depth of about one foot, Roman pottery and iron slag were encountered in abundance. Eighteen feet away was a dished rectangular floor, roughly three feet by two feet, comprised of large stone slabs and covered by large quantities of iron slag. The excavator interpreted this as the base for a furnace. Antonine period samian was found alongside Nene Valley and Oxfordshire colour-coated bowls and mortaria as well as the usual local coarse wares. The excavator proposed a 2nd to 4th century occupation. The nature of the pottery suggests a nearby villa, as yet undiscovered, connected at some period with iron-working (Scott-Garrett C. 1956).

#### (G30) COLLAFIELD AND EDGEHILLS

Large ore deposits and many scowles within the Parish. Also above CALLAMORE on Littledean Hill. An As of Trajan was found alongside a filled-in scowle hole at SO 6682 1481 in 1991. A circular hammered bloom weighing 5½lbs was found in the primary level of a trackway through the scowles at SO 6656 1567.

#### LLANGARRON CP (Herefs.)

'The Parish abounds with beds of iron cinders' (Watkin WT. 1877).

(G31) 'Slag deposits were reported here, and their presence has recently been confirmed; they lie north of the Llanerch Brook (Bridgewater NP. 1968).

#### (G32) PANBROOK (SO 5215 2200 and 5230 2200)

Slag deposits in two fields 1Km north of Llangarron village. Possible ditched enclosure at Woodfields immediately to west. S. Clarke (MAS) confirms finding R-B coarse pottery associated with slag from the area.

#### (G33) WALLINGSTONES (SO 503 222)

Mass of slag in two areas - Rim sherd of R-B pottery, not dated (Bridgewater NP. 1970). NB. Artefactual dating evidence is still too meagre for all of the above to be declared Roman ironworking sites.

LLANWARNE CP (Herefs.)

(G34) LOWER MONKTON (SO 495 274)

Mid-later 1st century AD pottery in association with several areas of tapped bloomery slag (Clarke S. 1984).

LYDNEY CP

(G35) LYDNEY PARK (SO 6160 0265)

Iron mine and mining settlement, possibly middle to later 3rd century AD. Later temple site. Bronze working of brooches in 1st century AD. Iron spear head typical of 1st century BC (Wheeler REM & TV. 1932).

Iron mine found beneath later baths building along with iron pick (Scott-Garrett C. 1959).

It was observed by Wheeler that '... almost the whole of the northern half of the Lydney camp is honeycombed with the hollows which represent blocked mine shafts. One of these was excavated in 1929.... and contained nothing but Roman relics' (Ibid.p.22).

(G36) PARK FARM (SO 625 018)

2nd to 4th century villa site. Much furnace slag, and hearth bases on site (Walters B. field survey). Park Farm villa is 1.25 Km SE of Lydney mine site, between it and the Severn (Fitchett M. 1986).

(G37) LYDNEY (SO 6290 0294)

Possible native settlement, enclosed with bank and ditch features alongside Roman road. R-B (or Native-Ware) pottery and many pieces of slag in surface soil (Harris F. 1936; 1937).

(G38) DEAN ROAD (SO 6400 0412)

Near Allaston Court. A large concentration of slag (bloomery, but undated) and charcoal alongside the Roman military road at this point. Also at SO 643 058. Near OLD CROFT Dean Road - three coin hoards, the latest in 1972 and 1991, both 4th century. See 13.2.

MATHERN C (Gwent)

## (G39) SUDBROOK CAMP (ST 505 873)

A promontory fort on the Severn estuary and much eroded by the river. Excavations revealed slag and charcoal dated to the first century BC by the excavator (Nash-Williams VE. 1939).

MITCHELDEAN CP

Mitcheldean is where the 30 feet wide early Roman military road from Gloucester (Kingsholm) connects with the Severn estuary to Ariconium and beyond military road, known locally as the Dean Road.

(G40) WIGPOOL COMMON - An 8km long outcrop of iron ore in the Crease Limestone extends from Wigpool Common, north west of Mitcheldean, to near Soudley in a southerly direction. It outcrops on the ridge west of Mitcheldean. Distinctive outcrops have been mined in the following localities:

SILVERSTONE FARM (SO 6458 1855 to 6480)

THE DELVES (SO 6480 1915 to 6505 1988)

The Delves extend for 650 metres in a NNE direction with an overall width of up to 100 metres.

BAILEY POINT (SO 6510 2000 to 6535 2025 to 6550 2000)

LINING WOOD TOP (SO 6550 1993 to 6571 1916)

SCULLY GROVE (SO 6573 1880 to 6575 1850)

WILDERNESS FARM (SO 6580 1827 to 6605 1740)

Paul Wildgoose estimated the total volume extracted from surface mining in the Roman period to be AT LEAST 289,702 cubic metres which equates to 600,000 tonnes of ore if a yield of 50% is assumed, and a

density of 4 tonnes per cubic metre. The surface outcrops were probably mined out in the Roman period. See text under Ariconium and Newent for full discussion.

**SMEETING ON SITE** - Wildgoose reported bloomery slag during his investigations but did not publish location references (Wildgoose P. 1988).

**(G41) WILDERNESS FARM (SO 6595 1805)**

Bloomery smelting slag in field but no dating evidence.

**(G42) EDGEHILLS (SO 6637 1613)**

A primitive bloom smithing hearth in a hollowed-out stone, with analysis. No associated dating evidence was recovered (Standing IJ. 1986; Price A. 1991).

**MITCHEL TROY C. (Gwent)**

**(G43) Talocher Farm and Court Farm. WONASTOW.**

Early Flavian Roman fort site suspected. Flavian pottery and coin of Nero. Slags in plough soil, probably from smithing (Clarke S. 1983 (May), and 1984 (Feb.)).

**MONMOUTH (Gwent)**

**BLESTIUM** on Antonine Itinerary XIII.

**(G44) WYE BRIDGE (SO 5115 1275)**

Pile driving at Wye Bridge revealed slag many feet below the river bed but no dating evidence could be recovered (Clarke S. 1981).

**(G45) GRANVILLE STREET (SO 5113 1291)**

Excavations cut through 13 feet of iron slag layers. Sealed 2nd century layer with much slag.

(SO 5114 1291) Probable Roman levels with slag. Furnaces of Roman date revealed in this area by R. Shoesmith in 1973 (See Monmouthshire Beacon 10.8.73)

(G46) SPENCER'S YARD (SO 5087 1273)

R-B pottery associated with much iron slag found in 1967 excavation (Clarke S. 1981). This site is immediately adjacent to G47.

(G47) GLENDOWER STREET SCHOOL (SO 50895 12765)

The school playground backs onto Spencer's Yard. Rescue excavation in 1988 by Dean Archaeological Group revealed a later 1st century smithing hearth with intact fuel and a small connected slag pit. An iron hearth rake was nearby. The hearth was set to the side of a shallow ditch and was possibly used to re-heat blooms in order to release entrapped slag prior to hammering off the residue and forming a billet or forgeable bar. Stratified pottery associated with the hearth was black late Iron Age type Native-Ware. Local parallels suggest a date range of c.AD 50 to 75. Abundant re-deposited bloomery smelting slag in nearby, later features which contained plentiful later 1st and 2nd century pottery (Walters B. 1988).

(G48) PRIORY FARM (SO 510 141)

A small excavation by Mr. G. Hall of Monmouth School found R-B pottery associated with iron slag.

(G49) TOWN WALL BY DIXTON GATE 'THE BURGAGE'

Scattered slag in black loam above natural. Samian plus R-B coarse pottery (Clarke S. 1981).

(G50) OVERMONNOW

Overmonnow was a 3rd/4th century development to the south of Monmouth town from which it is separated by the Monnow river. It became the local iron-working centre from the early 3rd century to the end of the Roman period.

(G51) FITZROY CLOSE (SO 5018 1238)

Furnace remains associated with 3rd century coins and R-B pottery.

(G52) ELSTOB WAY (SO 5020 1231)

Excavation prior to development revealed a shallow ditch containing Roman pottery and slag.

(G53) BAILEY PIT (SO 4870 1333)

R-B pottery associated with slag, furnace lining and vitrified sandstone.

SO 4871 1333 - Slag, ore, fired clay, crucible sherds, 4th century mortarium and Oxfordshire Colour-Coated wares (Clarke S. 1981).

(G54) ST. THOMAS' SQUARE - Heavy slag deposits 5 feet thick with R-B pottery (Clarke S. 1983)

(G55) OLD VICARAGE GARDENS (SO 50351 12375) Early excavations by MAS revealed furnace remains. Prior to development, the Glamorgan Gwent Archaeological Trust excavated part of the area but failed to excavate the furnace area. Oxfordshire Colour-Coated ware came from their excavation. Subsequently members of MAS retrieved a goodly selection of well-preserved 3rd/4th century Black Burnished wares and further Oxfordshire wares. 32 fourth century coins were retrieved from the contractor's spoil heaps and one 4th century melon-shaped blue-glass bead.

(G56) HADNOCK ROMAN VILLA (SO 535 151)

Furnace base in villa remains. The villa is in the middle of a field, above the Wye, and 2 Km upstream of Monmouth. The following fields, alongside the Wye, are rich in iron-working debris.

CINDER FIELD - Black Barn (SO 534 152)

Furnace remains and heavy slag deposits.

CONEGRE BARN (SO 5362 1454)

Slag and samian rim.

SO 5324 1395 - Presumed iron furnace from concentration of slag.

SO 5310 1385 - Slag scatter with heavy slag deposit to east (Clarke S. 1981; Clarke S. 1964; 1965; 1966).

The villa was assumed to be 2nd to 4th century from the reported pottery finds, however, 1st century black Native-Wares from the Iron Age tradition have since been identified including a Malvernian 'Hammer-Rim' and limestone-tempered wares suggesting a late Iron Age origin, or early Roman.

(G57) GREAT WARFIELD (SO 5285 1310)

A very heavy concentration of slag, burnt stone and fired clay with R-B pottery. Slag remains around 20 metres diameter. Close to Roman road from the Forest to Monmouth, now a hollow way here (Clarke S. 1983; 1984).

#### NEWENT CP

'It appears that iron has been made in or near the town, before large bellows were driven by water, so as more perfectly to extract the metal from the ore; for here vast quantities of rich iron cinders have been dug, and smelted over again at a furnace in this parish, not many years ago, tho' the furnace has for some time been out of blast. In digging for these cinders, the workmen found several coins of Julius Caesar, Nerva, Vespasian etc. and some pieces of fine pottery, now all dispersed or destroyed' (Rudder S. 1779).

The Foley Records for the Elmbridge Furnace, Newent, show that from 1690 to 1750 iron was smelted from three to four parts cinders to one part of mined ore. In the year 1693-94 £43 was spent on mined ore and £424 on cinders including washing. Andrew Yarranton in 1677 observed: 'In the Forest of Dean and thereabouts as high as Worcester, are great



and infinite quantities of cinders..... which will supply the ironworks some hundreds of years; and these cinders make the prime and best iron, and with much less charcoal than doth the ironstone' (The Foley Papers - Hereford Record Office; Bick D. 1987).

(G58) NEWENT, THE MOAT (Centred on SO 726 243)

Thirteen fields containing Roman period occupational and industrial debris identified by Dean Archaeological Group in 1990. Mainly 2nd century AD but with a few later 1st century pottery finds including South Gaulish samian. The total extent covers 117 acres of fields. Apart from iron smelting and primary smithing, lead and bronze working took place and a type of Severn Valley Ware pottery was made on site (Walters B. 1990). See also 'Dolocindo ?' Walters B. 1990).

(G59) BLACK HOUSE FARM

Fields north of Black House Farm called 'Ore Piece' and 'Ore Close' (GRO Foley Estate Maps).

Stephen Ballard wrote in his diaries for 1834: 'Went with Mr.Ellis and Mr.Lewis to see the old Iron Stone mines at Black House and at the Ore Piece about 2½ or 3 miles from Newent, the one at the Ore Piece belonging to Mr.Ellis. I should think it is very rich. The rock in which it crops up near the surface and the Ore was obtained by open work, quarry fashion, here and at Black House. Also saw Crokes hole at Cugley, a subterranean passage cut in the sand rock. It is not known when this passage was cut or for what purpose. It extends under the earth a great way.....I think it is not improbable that this was an entrance to an Iron mine, the passage is in the direction of the Black House, where iron stone was procured for the Furnace at Newent...'

The workings would have been in the Wenlock Limestone. See Aston Ingham CP. There is no evidence that this localised ore source was mined in the Roman period. (Bick D. 1987).

NEWLAND CP

A paved Roman road runs through the parish from Trow Green to Redbrook on the Wye (OS maps 1922)

ORE OUTCROPS - Some of the finest ore outcrops mined in Britain run the 5 Km length of the eastern parish boundary from Perrygrove to Bream.

(G60) PERRYGROVE/GREAT LAMBSQUAY WOOD (SO 576 091)

Landscaped scowles at Perrygrove. In 1849 at Perrygrove upwards of 3,000 Roman coins were found in three pottery jars. The 3rd century coins included barbarous radiates and officially minted coins including coins of Valerian and Postumus, some silvered (Bagnall-Oakley ME. 1881/82).

(G61) STOCK FARM VILLA (SO 5732 0860)

Adjacent to Perrygrove, in a field called CARWAIE on the 1608 map, a corridor-type villa was identified by B.Walters in 1985 from an aerial photograph, and subsequently confirmed by a trial excavation. Pottery finds were 2nd to 4th century AD. It would have been conveniently situated for an administrative official but this has not yet been confirmed by excavation (Walters B. 1985; Atkinson H. 1986; Walters B. 1990).

(G62) STOCK WOOD (SO 576 083)

Impressive scowles, 200 metres SSE of the villa, were wantonly being filled and levelled by the owner of Stock Farm during 1991.

(G63) CLEARWELL CAVES (SO 5770 0815)

Ancient ore mines open to the public.

(G64) NOXON PARK (Centred on SO 590 065)

A continuous line of scowles and mine entrances 1 Km long.

(G65) NOXON FARM (SO 5860 0590)

Many R-B pottery sherds on field surface. The field lies 500 metres west of the Noxon scowles. Further R-B pottery and coin finds from the adjacent field to the west at SO 5830 0600 including 1st century SVW storage jar rim. 2nd/3rd century pottery on Noxon field.

OXENHALL CP

(G66) From SO 704 273 to 715 299

Localised iron ores in hematized Triassic sandstones overlying the coal measures. Siliceous 'but rich goethite/hematite occurs as far east as Pool Hill which no doubt received attention in bloomery days' (Bick D. 1987). There is no evidence that these were mined in the Roman period.

PETERSTOW CP (Herefs.)

(G67) 'Two areas of slag deposits were reported by Wright, the largest being at the 'Cinder Grove', where Roman coins and pottery were also found. This is probably the area now occupied by Jackson's fruit orchards. Many thousands of tons of slag have been removed for re-smelting' (Bridgewater NP. 1968). It has not been possible to re-locate these slag deposits so it cannot be confirmed that they are of Roman origin or in which century they were produced.

RUARDEAN CP

(G68) PARK FARM (SO 6239 1889)

Very large, dense bloomery slag deposits running through hedgerow into field to south. 1st century SVW pottery only. R-B pottery also in field to west at SO 6202 1899.

RUSPIDGE CP

The Roman military 'Dean Road' passes through the parish for almost 5 Km. Immediately above it to the west there are ore outcrops and scowle workings around which a number of Roman coins have been recorded.

## (G69) BROOM HILL SO 6565 0912

250m west of the Dean Road, at the top of a rise, there is an area of bloomery slag associated with R-B pottery including a rare Oxfordshire colour-coated cup. The slag is probably re-deposited (Pers. Comm. B.Johns).

## (G70) DRUMMER BOY STONE (SO 65476 08980)

Set by the banks of a stream alongside the Dean Road is a hollowed-out stone containing traces of primitive smithing slag. Not dated (Standing LJ & Tylecote RF. 1977).

ST. WEONARDS CP (Herefs.)

'Abounds with slag heaps' (Watkin WT. 1877).

(G71) Bloomery slag on the parish boundary at SO 503 222 associated with R-B pottery (not dated). Bury Field at SO 496 231.

STAUNTON CP

## (G72) TOAD'S MOUTH (SO 546 127)

Large deposit of tapped and untapped bloomery slags with hearth bases, but no datable material published (Standing LJ. 1987). NB: One of the hearth bases had a section of a Roman-type iron bar fused to it which is unpublished.

There are ore outcrops for long distances within the parish, many mined out as scowles and now back-filled. A large, trapezoidal shaped, ditched and banked enclosure was discovered in dense woodlands to the east of the ore outcrops in 1992 at SO 554 116. An ancient hollowed

trackway abuts its eastern bank. No dating evidence yet but tapped bloomery slag was retrieved from the roots of fallen trees. Much of Staunton overlies thick layers of slag. Some are definitely of medieval origin.

The Roman roads from Coleford and from Mitcheldean meet near Staunton then continue as one to Monmouth.

Roman coin from Staunton, Allectus (Walters B. 1985).

No ironworking in Staunton has yet been proved to be of Roman date.

(G73) CHERRY ORCHARD - On the southern edge of the parish where it bounds Newland CP. Two coins of Victorinus and slag deposits alongside the Roman road to Redbrook (Bagnall-Oakley ME. 1881/82).

#### TIDENHAM CP

(G74) BOUGHSPRING VILLA (ST 5756 0974)

2nd to 4th century villa site. Major alterations and additions in mid-4th century. Smelting and smithing slags around villa and generally in area, but not in significant quantities. (Pullinger J. 1990).

ST 559 972 - Unpublished OS records mention tapped slag in this vicinity.

(G75) SEDBURY PARK (ST 556 932)

Roman occupation site. Buildings. Pottery kilns. Slag (Archaeological Journal, 1860,192-193; Ormerod G. 1860).

(G76) PILL HOUSE (ST 568 957)

Large slag deposits on beach along with ore. Believed to be of Roman origin but almost certainly re-deposited (Allen JRL & Fulford MG. 1987).

TRELLECH UNITED (Gwent)

(G77) HYGGA FARM (SO 4802 0417)

Heavy slag deposits on surface suggests smelting furnace. Light scatter of R-B pottery (Clarke S. 1981).

(G78) TRELLECH GAER (SO 4930 0375)

'The best example of a (Roman ?) iron furnace I have ever seen' (Clarke S. 1981). Associated R-B pottery sherds.

(G79) HYGGA (SO 489 040)

Roman ? iron furnace suggested by heavy slag deposit (Clarke S. 1983 (May)).

(G80) HYGGA (SO 4960 0390)

1st century BC/AD continental 'Oldbury' type glass bead. Dark blue with marvered opaque white spirals, Guido Class 6 (Guido M. 1978; Clarke S. 1983 (August), & Fig.1 illustration).

(G81) HYGGA (SO 4922 0434)

Smelting furnace. Heavy areas of slag and charcoal exposed. Tap-hole slag. Considerable slag in nearby stream and bank. Trackway to Hygga partly surfaced with slag at SO 488 034 (Clarke S. 1984).

(G82) HYGGA (SO 4989 0404)

Heavy layers of iron slag. Sherds of R-B pottery.

(G83) TRELLECH (SO 4915 0345)

Decorated samian Form 29, early Flavian, 70-79 AD. Heavy slag at SO 491 034 plus sherds of R-B pottery (Clarke S. 1984 February).

(G84) BOC ORES - Many small fragments of bog-type ores have been collected from the Hygga area where they occur naturally. Springs near Trellech are rich in iron due to bog ore deposits.

(G85) GREAT CRUMBLAND (SO 4825 0248)

Slag concentration with light scatter of R-B pottery. Further slag to south of grid. ref. SO 4812 0105 - Spread of slag over this field. All pottery finds of 1st century date including black Native-Wares (Clarke S. 1983 May).

TRETIRE & MICHAELCHURCH CP (Herefs.)

Large slag deposits recorded in the parish (Watkin WT. 1877).

'In addition to reports of large slag deposits here, the Archenfield Archaeological Group have located a possible smelting site. Roman coins and pottery were found in the Tretire district' (Bridgewater NP. 1968).

(G86) SO 529 244 - Bloomery slag, black soil and R-B pottery just east of the Parish boundary (Bridgewater NP. 1969).

(G87) SO 520 238 - Excavation. Bloomery slag in upcast from digging moat. Around the site there were 'large slag deposits containing a Roman coin' (Bridgewater NP. 1969).

(G88) ROMAN ALTAR re-used as a font in the parish church. Inscription reads: DEO TRIVII BELLICVS DONAVIT ARAM, 'To the god of the three ways, Bellicus gives the altar' (Watkin WT. 1877).

WALFORD CP (Herefs.)

(G89) GREAT HOWLE FARM (SO 6128 1871)

Enclosed 1st century AD R-B site. Heavy slag concentration and charcoal hearths. Baked clay. All pottery 1st century SVW types and South Gaulish samian, Form 37, early Flavian. Also 1st century AD glass bead, amber with blue and white cables. Guido Class 9c. Also mid-1st century 'Dolphin' type brooch of c.AD 45-60 (Walters B. 1985; 1987, & 1988,; Guido M. 1978).

(G90) CINDERBURY WOOD (SO 616 192)

Close by the Great Howle site. Surrounding fields contain the remains of around 50 charcoal hearths.

#### WELSH NEWTON CP (Herefs.)

(G91) GWENHERRION FARM - Welsh Newton Common.

Slag, iron furnaces. Pottery from Form 37 late Flavian samian to 2nd century Form 31 dish. Also BB1 and amphorae (Clarke S. 1983 May; Clarke S. 1984 Feb; Bridgewater NP. 1968).

#### WEST DEAN CP

(G92) IRON ORE OUTCROPS

These occur west of Ellwood on the west side of the parish and especially at BREAM SCOWLES to the south west corner of the parish where a hoard of Roman silver coins was found.

#### COIN HOARDS

Important Roman coin hoards have been found at:

PARKEND (1852) 1,000+ coins, Julia Domna to Allectus.

BREAM SCOWLES (1854) 155 silver denarii, Nero to Commodus.

KIDNALLS, c80 denarii deposited in the late 2nd century.

THE DEAN ROAD now forms the eastern boundary of the parish between Blackpool Bridge and Oldcroft (1st century Roman military).

#### WESTON-UNDER-PENYARD CP (Herefs.)

(G93) ARICONIUM - Bromsash

ARICONIUM is discussed at great length in the text that follows so only a summary has been allowed here.

Pre-Roman settlement and iron-working area centred on SO 6470 2385.



Mid-1st century iron-working enclosures centred on SO 6415 2470.

2nd century iron-working areas centred on SO 6445 2440 (Hask Barn field) and SO 6425 2370 (Cinder Hill).

2nd to 4th century civilian area centred on SO 646 239.

ARICONIUM is the Roman name for the late Iron Age settlement at Bury Hill where there is evidence for 1st century AD, pre-Roman iron-working and trading.

There is evidence that c.AD 50 the settlement was chosen by the Roman military to become a centre for iron production, smelting, primary smithing and manufacture in support of the campaigns into Wales. A new working area was chosen 1 Km north of the existing settlement (see 10.2).

2nd CENTURY - Early in the 2nd century two new iron-working areas were opened up at Hask Barn field and on Cinder Hill. Administrative changes apparently took place and the first 'villa' type building was erected close to the earlier native settlement.

3rd/4th CENTURIES - Ariconium appears to flourish in a modest way more as a staging post. Organised industry seems to have ceased although a very reduced amount of iron-working may have continued for local needs. None of the iron-working areas produce much pottery of this period. Neither is there evidence for estate arable farming. None of the surrounding fields that are presently under the plough contain a single sherd of R-B pottery which one would expect from a manuring process. It is possible, of course, that some were used for grazing. Remarkably, the coin sequence seems to end with Valentinian I, in the 360s. Middle Hask field, the villa and presumed Mansio area, continues to produce a fair quantity of 3rd/4th century coins and pottery including fine, colour-coated table wares from Oxfordshire, but also including drinking vessels from the Nene Valley.

THE MAIN REFERENCES ARE:

Brayley EW & Britton J. 1805, Vol.VI.

Fosbroke TD. 1821.

Wright T. 1844.

Grover JW. 1873.

Watkin WT. 1877.

Bull Dr. 1882.

Jack GH. 1923.

Bridgewater NP. 1959.

Bridgewater NP. 1966.

Garrod AP & Moss PA. 1967 and 1968.

Garrod AP & Bridgewater NP. 1968

Bridgewater NP. 1968.

Walters B & M. 1989.

Walters B. 1992.

Walters B. Ariconium Monograph (DAG - forthcoming)

AERIAL PHOTOGRAPHS - An extensive range of aerial photographs covering the whole of the Ariconium area were taken on behalf of DAG by M.Walters in 1989 and 1990. DAG flight, film and frame numbers are indicated in the text.

WHITCHURCH CP (Herefs.)

'About Whitchurch and Goodrich the cinders are scattered about in deep beds' (Grover JW.1873).

The Parish of Whitchurch abounds with immense beds of iron scoriae and cinders. The hills called The Great Doward and The Little Doward have been considerably mined (Watkin WT. 1877.).

(G94) WHITCHURCH (SO 549 175)

'Numerous reports of slag deposits suggest intensive operations here, and several excavations by Archenfield Archaeological Group support this view. It seems the whole village overlies a thick bed of slag..... In 1962, further excavations by the AAG revealed decorated

samian at depths of 8 feet in the slag deposits.....The ore was presumably mined in the Doward hills. Excavations in the Sellarsbrook valley also revealed a slag-surfaced road in three places. Although this road could not be dated, it is probably a section of the XIIIth ITER' (Bridgewater NP. 1968.).

(G95) DAFF-Y-NANT (SO 5450 1713) Now beneath a dual carriageway. Non-domestic building with slag floors, R-B pottery and much iron slag. Excavated by Bridgewater c.1958 (Bridgewater NP, 1959).

(G96) WHITCHURCH (SO 548 172)

Bridgewater cut a section here at A.J.Kirby's Museum and wood yard. 'Below a sandy layer, a thick layer of iron slag containing R-B coarse pottery which extended to about 6 feet below ground level' (Bridgewater NP. 1964,88).

(G97) WHITCHURCH

'Coins, Fibulae, and other things..... have been found in the beds of Cinders at certain places. This has occurred particularly at the village of Whitchurch, between Ross and Monmouth, where large states of Cinders have been found, and some of them so deep in the earth (eight or ten feet under the surface) as to demonstrate, without other proof, that they must have lain there for a great number of ages. The present writer has had opportunities of seeing many of these Coins and Fibulae, &c., which have been picked up by the Workmen in getting the cinders at this place in his time; but especially one coin of Trajan, which he remembers to be surprisingly perfect and fresh considering the length of time it must have been in the ground. Another instance occurs to his recollection, of a little image of brass, about four inches long, which was then found in the Cinders at the same time being a very elegant female figure in a dancing attitude, and evidently an antique by the drapery' (Wyrall G. 1877/78).

(G98) LORDS WOOD (SO 552 146)

Excavation by A.L.Sockett and boys of Monmouth School from 1959-62 (unpublished). A sub-circular enclosure and ditch containing roof-

tile, pieces of box flue tile, R-B and black Native-Ware pottery, iron nails and much slag. Also 'Dolphin' type fibula. The site is on the lower slopes of the Doward, overlooking the Wye. From the finds it would appear to have been the site of an enclosed Native settlement which continued into the Roman period. (Pers. Comm. A.L. Sockett).

### WOOLASTON CP

#### (G99) CHESTERS VILLA (ST 597 997)

A 2nd to 4th century major villa site overlooking the Severn estuary with convenient access for shipping. A developed corridor-type villa facing south by west, with two periods of construction, the hiatus being early in the 4th century, was excavated by Dr.C.Scott-Garrett and F.W.Harris in the 1930s. The earliest phase was most likely in the early Antonine period. Both phases had their own baths' systems. In 1989, aerial photography by Mark Walters revealed a larger building facing SSE with buttresses suggesting multi-stories. Although unexcavated it is probably a 4th century feature, reflecting the changes that took place at the nearby Boughspring villa (See Tidenham CP).

#### IRON-WORKING

'..... a layer of iron slag clinker, a material which can be found almost anywhere on the site' (Scott-Garrett C & Harris).

(G100) EXCAVATIONS 1988-90 - Late Roman industrial building with sixteen bays, 16.5 metres by 8.2 metres. Post-built construction on two parallel rows of pad-stones. Several iron-making furnaces, some in pairs close to ore-crushing units. The iron-working phase, on limited pottery evidence, was given a Terminus Post Quem of the mid-3rd century AD. Located at ST 59660 98600 (Fulford M. 1991 (Feb.); Fulford M. 1991).

#### (G101) HORSE PILL

Dense strew of ore and slag; walnut to fist sized fragments of ore. R-B pottery nearby. Pill Mouth ST 580 973. Beach to NE ST 583 976.

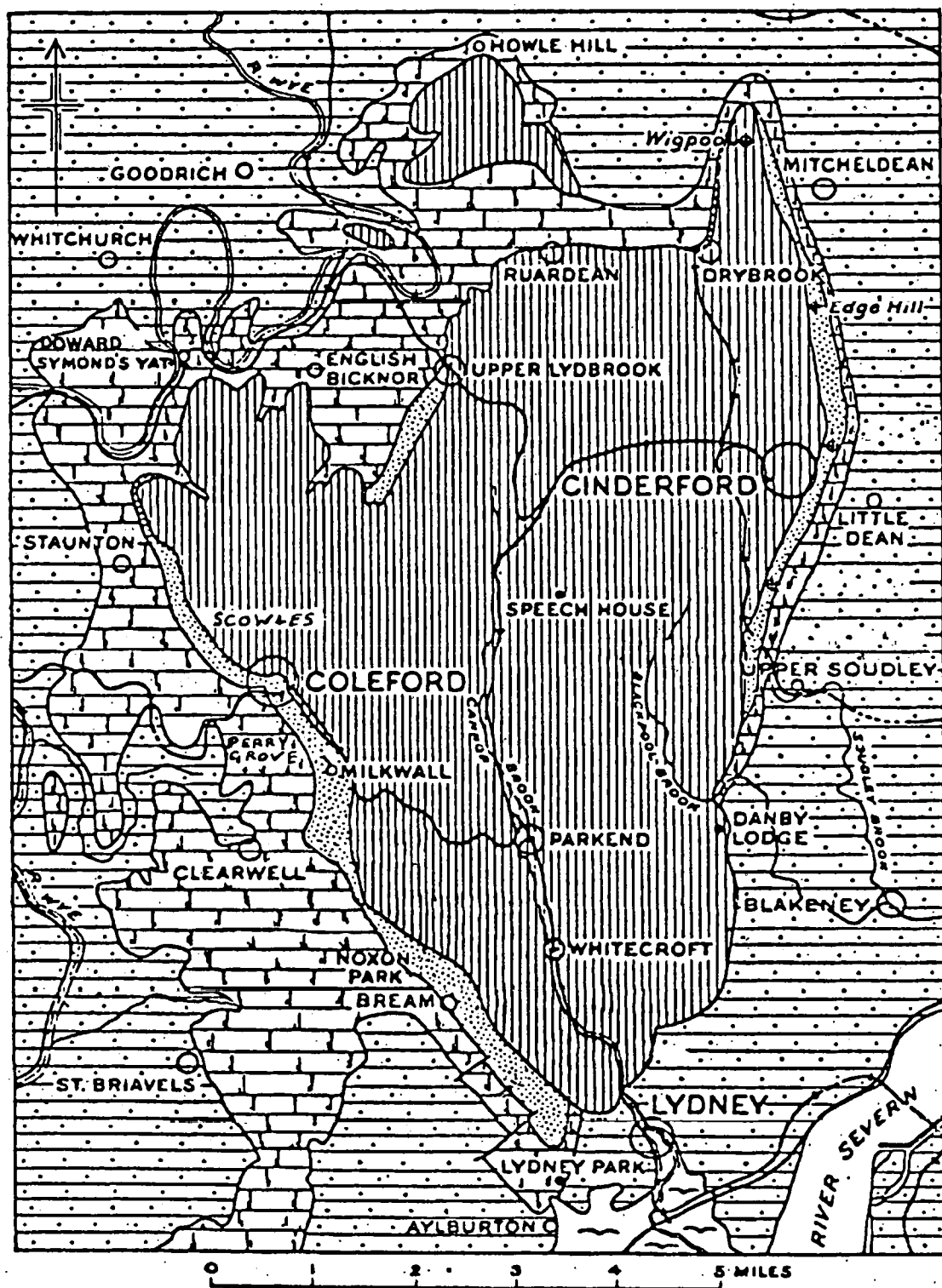
(G102) CLIFFS NORTH OF HORSE PILL (ST 582 977)

An observed moisture-retaining area was given a trial excavation by DAG in 1989. It produced 1st century black Native-Ware pottery and early Severn Valley Wares as well as slag fragments about 1 metre deep. A few sherds of R-B pottery were found on the field surface (Walters B. 1989 May).

DAG AERIAL SURVEY

Chesters Villa recorded on 12/17-20 18.7.89

# GEOLOGICAL MAP OF THE FOREST OF DEAN



**INDEX**

	ALLUVIUM		DRYBROOK SANDSTONE
	COAL MEASURES		CARBONIFEROUS LIMESTONE
			OLD RED SANDSTONE



## 6. THE GEOLOGY OF DEAN

6.1 The simplified GEOLOGICAL MAP OF THE FOREST OF DEAN and the SECTIONAL MAP OF GEOLOGICAL STRATA clearly show what underlies the landscape of the Forest of Dean between the rivers Severn and Wye.

From East to West the Old Red Sandstone of the Severn Plain gives way abruptly to steep inclines on which outcrop first, the Quartz Conglomerates, on top of which are the Carboniferous Limestones and the Drybrook Sandstones which, in turn, are overlain by the Coal Measures. From SW to NE there is a similar pattern. The whole of the central area is heavily forested and beneath the Forest lie the Coal Measures.

Dean ores are found principally in the Carboniferous Limestone; specifically in the Crease Limestone. Important quantities of ore also occur in certain beds of dolomite in the Drybrook Sandstone. Small amounts of ore have also been found in the sandstones of both the Drybrook Sandstone and the Coal Measures.

As the SECTIONAL MAP shows, the ore-bearing strata outcrop in narrow bands for long distances around much of the Forest of Dean. It is from these outcrops that ore was mined in the prehistoric and Roman periods.

It should be noted at this point that usable ores have been found in the sandstones and the Wenlock Limestone north of the main Forest area, and bog-ores have been identified immediately to the west in the hills of Gwent. The latter were, with some certainty, utilised during the period under discussion. There is no evidence that the localised deposits north of the Forest were mined during the first four centuries AD (Bick D. 1986 & Gazetteer references: G1, G59, G66 and G84).



## 6.2 THE COMPOSITION OF DEAN ORES

The ores are essentially hematites. The colour of the ore is usually grey/black, frequently with a metallic lustre. Goethite is a dominant constituent. Goethite is crystalline and of a fibrous structure, frequently forming closely packed 'needles'. It is one of a group of hydrous oxides of iron collectively called Limonite. In fact Dean ores exhibit a very wide variety of structures, but, two features make them particularly distinctive:

1. They are exceedingly low in phosphorus which is present only in trace form, or non-existent.
2. Their low sulphur content, 0.01% or less, made them particularly desirable to ancient iron smelters, the presence of sulphur being detrimental in the smelting process.

In forms the ores range from the richness of the 'flint' ores (so called locally in Dean because of their hard, sharp-edged, fractured flint-like shapes) to the stalactitic, gravelly ores which can easily be dug with pick and shovel (Sibly TF. 1927; Trotter FM. 1942).

## 7. THE GEOMORPHOLOGY OF DEAN

### 7.1 DISCUSSION, DESCRIPTION AND LOCATION OF ORE OUTCROPS

The ores extracted in the Iron Age and Roman periods would have come mainly from the Carboniferous Limestones, in particular, the Crease Limestone. Mining, in the sense of tunnelling, would not have been a necessity for many years for the ore-bearing limestones outcrop in narrow bands for long distances around the rim of the Forest plateau. Natural erosion would have left many of these very noticable so that, long before the technology developed to smelt these minerals into implements, prehistoric man made use of the sharp-edged 'flint-like'

ores as natural artefacts which did not require 'retouching' and shaping. These are frequently found in Dean among prehistoric flint debris and far away from the ore outcrops.

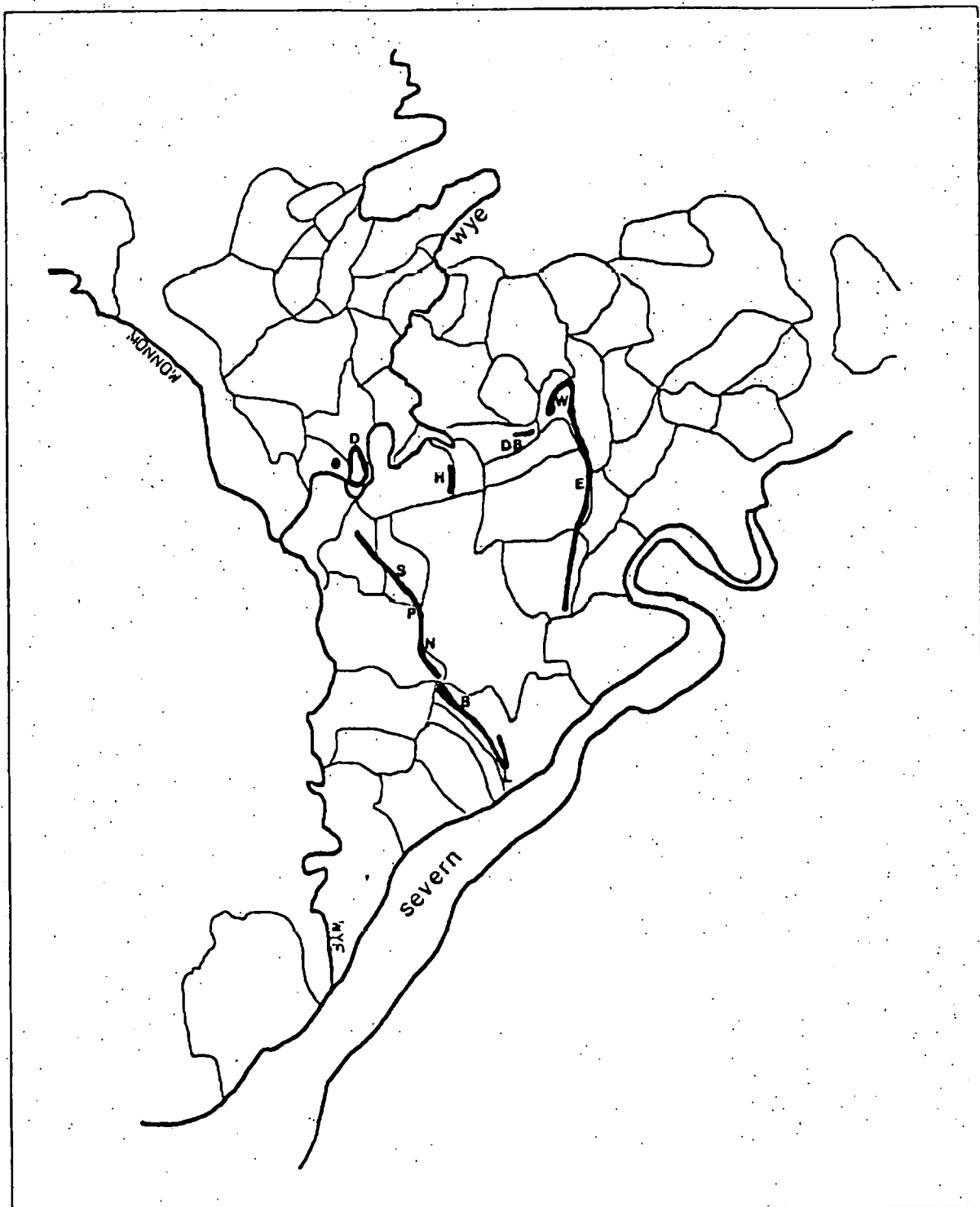
In the areas of outcrop, the iron ore diminishes in depth, especially on the western side of Dean. On the eastern side of Dean it was worked to greater depths. Rich hematite was extracted from the surface outcrops in the pre-Roman and Roman eras, the evidence for extraction remaining in the form of 'scowles', the local name for the numerous hollows and cavities which, when joined up, form sinuous, tortuous, ditch-like features, many of which contain grotesquely-shaped columns of limestone from round which ore has been removed.

SOOWLE - The local name is possibly an English corruption of the obsolete Welsh word YSGAL which meant 'bowl'. Phonetically it is pronounced in a similar way to scowle, especially with the inevitable English removal of the 'y', a vowel in Welsh but a consonant in English. The 'a' in ysgal is as in 'far', and the 'g' would have sounded very like an English hard 'c'.

With logical certainty, the first iron ores to be gathered and smelted in Dean would have been picked with ease from the surface where the iron-stones had weathered and eroded for millennia. The amount so gathered is incalculable but it may well have been centuries before there was a need to delve out deep scowles, following narrow leads in quest for more massive deposits.

#### LOCATION OF SCOWLES AROUND DEAN

Starting on the north side of the Forest, then following the outcrops round the east side, the south and west sides, to conclude with an isolated outcrop, again on the northern side of the Forest. Note: This is a locational list of ALL ore outcrops and not just those for which there is evidence of Roman-period mining.



### PRINCIPAL ORE SOURCES

W = Wigpool	E = Edge Hills	L = Lydney	B = Bream
N = Noxon	P = Perrygrove	S = Scowles Village	
D = Doward	H = Hangerbury	DB = Drybrook	

#### DRYBROOK CP

One scowle is still to be seen near the top of a hill-side just west of the Drybrook quarry (G14). Others south of the Ruardean to Puddlebrook footpath were filled in over recent years.

#### MITCHELDEAN CP

Wigpool Common (See G40). Massive and extensive scowles sub-divided into six distinctive areas.

#### MITCHELDEAN & LITTLEDEAN CPs

Wilderness Farm to Soudley (G41, G30 & Ruspidge CP)). A more or less continuous line of surface workings for  $4\frac{1}{2}$  miles, many now filled in. When describing several 19th levels that had been cut into the side of Edgehills, Trotter observed of Level 1 at Beach Pit: 'Extensive ore bodies originally lay between this level and the surface but, as it was found that much ore had been won from surface excavations, the level was not carried to the boundaries of the gale'. Level 1 was 440 feet above OD. Level 2 was deeper at approximately 360 feet above OD. Again Trotter observed: 'Large ore bodies were proved on No.2, some of which connected with surface excavations'.

These observations suggest that tunnel mining had taken place from the bottom of the surface scowles, following clear, but narrow leads. Some of this mining may have taken place during the later Roman period after the surface workings had become exhausted but this is not yet proved.

Trotter comments further on the surface outcrops: Old Crop Workings - 'These take the form of old open-cast trenches or of small bell-pits sunk on the crop of the vein. They appear in the woods 100 yards SSW of Westbury Brook shaft and trend in a southerly direction to St. Annal's shaft. They can be traced from thence to a point 250 yards SW of Abbotswood, Ruspidge, where they are lost on the outskirts of that village. Beyond it, however, they re-appear on the same line of strike and may be followed from the Soudley Valley for 450 yards to the south-south-west. Ignoring the break in the line of workings in

Ruspidge, where they may have been obliterated, the distance along which the crop of this horizon is traceable is four miles' (Trotter FM. 1942).

#### LYDNEY CP

Lydney Park (G35) - Roman period tunnelling for ore within an Iron Age Hill Fort and later temple complex site (Wheeler REM & TV 1932).

To the NW of Lydney Park, through Old Park Wood, there is a continuous line of workings in the outcrop of the Crease Limestone.

#### WEST DEAN CP

Bream Scowles (G92) - Among the most impressive and best preserved series of scowles. About 1 Km south of Bream with easy access to the west of the Bream to Lydney road, the B4231.

Noxon Park (G64 & G65) - From Clements Tump to Bream there is a continuous line of scowles. Outcrop workings appear again in woods behind a disused Dolomite quarry at Bream Tufts, just NE of Bream Cross at SO 594 059. The scowles follow the Crease Limestone in a north to north west direction, but surface workings are also found on the outcrop of the Lower Dolomite where the ore was extracted from along joints and from irregular pockets.

The Noxon area demonstrates remarkably that ancient miners did not restrict their efforts to the easily won ores within a few metres of the surface. There are numerous examples of narrow entrances opening into caverns which have now collapsed leaving the floors strewn with fallen trees and surface material. Noxon is dangerously honey-combed with extended ancient land pits, many of which were later connected to 19th century deep pits and their levels.

#### NEWLAND CP

From Clements End, through Clay Wood to Sling and on to Clearwell Caves there are unfilled scowles still to be seen (G63).

Perrygrove, Stock Wood, Little Eddies Field Wood and Great Lambsquay Wood. Major, and still impressive, outcrop workings (G60, 61 & 62).

At Puzzle Wood some of the scowles have been landscaped. Elsewhere, in very recent years, they have been used as dumping grounds for rubbish and hard-core, however, there are still magnificent examples worth seeing.

#### COLEFORD CP

Scowles village, just west of Coleford town. Unaltered scowles accessible from the village (G12).

#### STAUNTON CP

Between Scowles village and Staunton long lengths of ancient outcrop workings have been destroyed by massive quarrying. Recently, others have been filled with quarry rubble. Around 750m of scowles are still intact but under threat due to an application to further extend the quarry (G72).

#### WHITCHURCH CP & GANAREW CP (Herefs.)

The Doward. Many scowles still visible (G94 & 98).

#### ENGLISH BICKNOR CP

Hangerbury Hill, 4 kilometres or so east of the Doward on the north side of the Forest and 4 kilometres SW of the Drybrook scowles. Scowles still to be seen (G15).

## 8. KNOWN TECHNOLOGY OF LOCAL IRON PRODUCTION (A Concise Outline)

### 8.1 ORE EXTRACTION

#### IRON AGE

- a. 'Picked' and gathered from eroded outcrops within Dean.
- b. West of Dean in the hills of Gwent - Bog-ores from stream banks and marsh areas.

- c. North of Forest area - There are close-to-surface ores in the Wenlock Limestones and some sandstones. These may have been utilised but the proof is lacking.

#### PRE-ROMAN PERIOD (1st century BC to 1st century AD)

- a. Outcrop mining began within Dean. Scowle hollows began to deepen.
- b. West of Dean - Bog-ores.

#### ROMAN PERIOD

- a. Continued and extended outcrop excavation for ores.
- b. Tunnelling confirmed at Lydney Park and suspected at several other outcrop sites where the scowle had bottomed out but narrow veins were still visible extending underground.
- c. Bog and other ores were still used, where available, at relatively short distances from the rich ores of Dean.

## 8.2 ORE PREPARATION

### ROASTING

It is generally considered that the hematite Forest of Dean ores did not require roasting, unlike the Carbonates of the Weald. There is no local excavated evidence for roasting hearths in the Roman period.

### CRUSHING

Crushing is the term applied to the hammering of the ores which broke them into smaller fragments suitable for charging a furnace; these would generally be around 4-8 cm long and 2-4 cm thick. An ore-crushing unit has been identified by excavation at Chesters Roman villa, Woolaston (Fulford M. 1990; 1991).

Crushed ore fragments have been found at most Roman period smelting sites in Dean.

### 8.3 ORE SMELTING

The earliest furnaces may have been simply a bowl-shaped hollow cut into clay or bedrock. They would have been inefficient unless provided with a clay dome or chimney and possibly a hole at the base through which to tap away the slag into a lower pit or hollow.

So-called SHAFT-TYPE furnaces would have had such a clay chimney, probably a metre high, or more. Ample space was needed at the base of the shaft for the charge of fuel and ore. Slag was tapped away through a 'tap-hole' at the base. This type is typical on Roman-period smelting sites in Britain.

For a detailed discussion of furnace types and smelting experiments the following may be consulted: Cleere H. 1971 & 1972; and Tylecote RF. 1986.

Shaft-type furnaces have been excavated at Barnfield, Hangerbury Hill (G15), at Chesters Villa Woolaston (G100), Ariconium (G93), Monmouth (G45, G47) and Overmonnow G55). The internal diameter of these shaft furnaces was between 20-30 cm. Bowl-type furnaces have been excavated at Ariconium (see 9.2).

#### FURNACE TEMPERATURE

A temperature of at least 1150 C. must be achieved before the slag begins to separate from the droplets of reduced iron which gradually grow into a 'bloom' of iron. At around 800 C. reduction takes place, that is, the removal of oxygen from the oxide ore. Gangue minerals cannot be removed below 1100 C. Liquation of slag takes place at about 1150 C.

It should be noted that gangue minerals such as silica and alumina have much higher melting points, in excess of 1600 C. however, with iron as a flux they melt below 1200 C. thus all ancient slags are iron-rich, the iron being lost to the slag as a flux. NB - the addition of  $\text{Fe}_2\text{O}_3$  to  $\text{SiO}_2$  (silica) produces an artificial mineral



known as fayalite with a melting point that is lower (around 1250 C.) than that of silica alone (1610 C.), a temperature that could not be attained in early furnaces.

#### BELLOWS

These high temperatures were achieved by the use of bellows inserted into the furnace through a hole or tuyere.

#### FUEL

The fuel was always charcoal which was broken into pieces 3-8 cm long. Tylecote suggests that: 'The early smelter preferred the use of hardwood charcoals which are denser and longer-burning and so somewhat more economical. Oak was the main source of fuel in Britain until the 13th century; and after this, shortages forced the smelter to turn to whatever timber was available' (Tylecote RF. 1986). However H.Cleere pointed out that a variety of woods were used for charcoal in the Weald, with hardwoods predominant (Pers. Comm. H.Cleere).

A charcoal store was located at Chesters villa, Woolaston, immediately adjacent to the furnaces (Fulford M. 1990).

Many thousands of charcoal hearths are known in the Forest of Dean but few have, or can with certainty, be dated. In very recent years Brian Johns has set about the task of identifying and recording all the charcoal hearths in the Blakeney Hill woods area of Dean with a view to dating when possible (Johns B. 1989).

#### REMOVAL OF THE 'BLOOM'

Three methods are suggested for the removal of the bloom from the furnace:

1. It should have been possible to remove the bloom with tongs from the top of the shaft of a furnace where the slag had been tapped away.

2. Often, part of the shaft would have to be demolished to facilitate the removal of the bloom especially if the slag had not been tapped.

3. If the clay shaft had been constructed on a hard base it would be possible to lever the furnace on to its side. The bloom and slag waste could then be knocked from the lower end and the shaft re-erected, with only minor repairs to its base, and re-used. This method has not yet been substantiated although it appears reasonable.

#### 8.4 RE-WORKING THE BLOOM (PRIMARY SMITHING)

Once removed from the furnace the bloom would require re-heating in a primary smithing hearth in order to facilitate removal of adhering and entrapped slag. Some of this residual slag would trickle away when re-heated but hammering on an anvil would be necessary to release unwanted impurities before shaping the product into a wrought iron bar ready for forging by a secondary smith.

Six smithed billets/bars/buns have been found in Dean. The bars came from Hangerbury Hill (G17), Cowmeadow Farm (G20) and Staunton (G72), and the bun-shape ones from Drybrook (G14), Littledean (G27) and Edgehills (G30). The latter were not from datable contexts although they are likely to be earlier than Medieval.

A finely-preserved hearth, probably used for primary smithing, was excavated in Monmouth, dating to the 1st century AD. The final charge of fuel was still intact and the hearth had been used many times. Narrow trickles of slag had run from the hearth into a shallow slag pit alongside (G47).

### 9. THE PRE-ROMAN IRON INDUSTRY IN BRITAIN

#### 9.1 SUMMARY OBSERVATIONS AND SOME RECENT DISCOVERIES

The Greek geographer, Strabo, who was born c.64 BC and spent a number of years in Rome, wrote of Britain in the early Augustan period and

specified its principal exports as wheat, cattle, gold, silver, iron, hides, slaves and hunting dogs (Strabo. 4,5,2).

Half a century earlier Julius Caesar (De Bello Gallico: V.12) recorded that there was iron production in the coastal areas of Britain but he considered it to be low in output. For certain, the southern British iron industry must have expanded with some impetus during the second half of the 1st century BC in order for iron to be considered by Strabo as a notable item of export.

The Iron Age in Britain is usually cited by historians as beginning in the 7th century BC, however, the excavated evidence and scientific dating of iron-working sites to that period is still thinly perceived. There is more certain evidence for the widespread use of iron from the 5th century BC.

In his 'The Prehistory of Metallurgy in the British Isles', R.F.Tylecote tables forty seven British sites offering evidence for pre-Roman iron-working. Only one of these, Huckhoe in Northumberland, has produced a C14 date of 7th - 6th century BC (Jobey G. 1959; 1968).

Sixteen sites offered dates between the 5th and 3rd century BC; seven slotted into the 2nd century BC and no less than twenty two fell into the late Iron Age, 1st century BC and 1st century AD. The table was fairly up-to-date for the mid-1980s but was not comprehensive.

On only sixteen of the sites was there clear evidence for furnaces; most produced slag or cinders suggesting smelting or smithing on the site. Eighteen sites produced ore fragments and on nine iron was found suggesting smithing on site (Tylecote RF. 1986).

An important recent discovery was a sub-rectangular early Iron Age enclosure at Farthingstone, Northamptonshire, where tapped smelting slag was identified as pre-5th century BC. The slag samples were apparently from within the rampart core. A 5th century BC date had been proposed for the construction of the hill-fort. The industrial

activity clearly preceded it and may have over-lapped the period of use of the fort (as at Hunsbury in the same county). The presence of tapped slags prompted J.G.McDonnell, who reported on them, to speculate that Northamptonshire may well have been one of the most advanced centres for iron production in Britain during the early Iron Age (McDonnell JG in Knight D. 1986-87).

Later Iron Age iron-working sites recently excavated under the direction of Peter Crew were at Crawwellt West, an upland iron-working settlement, and at Bryn-y-Castell hill-fort, in Merioneth, Wales. Both produced dates confirming smelting and smithing from the 1st century BC into the Roman period. The raw material was bog-iron ore. Two dumps survived at Crawwellt, one of raw ore, one of roasted ore (Crew P. in Scott and Cleere 1986 and Crew P. 1989).

## 9.2 PRE-ROMAN IRON-WORKING AROUND DEAN

### LLYN FAWR (915 035)

Llyn Fawr is less than forty miles west of the Forest of Dean, north of the Rhondda Valley in Glamorgan. It was drained in 1911. From the peat deposits at the bottom of the lake a remarkable hoard of bronze and iron objects were recovered, tentatively dated to around the 7th century BC. Most of the artefacts, typologically, were identified with the Halstatt C tradition and there is still much speculation as to how they arrived in Britain, indeed, as to whether they may be purely local native developments. Megaw sees them as 'British' regional variants, rather than imports, forming part of a continuous tradition of adopting and copying European fashions in bronze (Megaw & Simpson Ed. 1981). The bronze loop and socket axes were proposed as of local derivation. So was an iron, socketed sickle blade. Speculatively, Savory suggested that the objects may have been acquired by the hill folk raiding some rich settlement in the fertile lowlands of the lower Severn basin, an area only thirty miles downstream from where Dean bounds the Severn estuary (Savory HN. 1976).

Whether or not the iron objects were of British manufacture, their presence in Llyn Fawr suggests that at least some people in this region were aware of iron and its potential at this early date.

MIDSUMMER HILL (SO 760 375), an early Iron Age hill-fort, is only fourteen miles NNW of Dean on the southern edge of the Malvern Hills. It was part excavated under S.C.Stanford between 1965 and 1970. Iron ores, smelting slags and parts of iron blooms were identified and dated from the founding of the settlement in the 5th century BC. The fort at Croft Ambrey, 6 miles NW of Leominster, Herefs. was also excavated under Stanford (Stanford SC.1974). It produced similar evidence and a similar foundation date. The ores were examined by Eric L.Crooks and compared with ores from South Staffs., Wiltshire, Oxfordshire and the Forest of Dean. Crooks reported: 'Evidence for identifying positively the prehistoric ore source is slight but the suggestion of the Forest of Dean haematite is probably justified analytically and geographically for Midsummer Hill. A more local source such as the Cleve Hills seems possible for Croft Ambrey (Stanford.1981). One could perhaps wish that more samples had been analysed from local sources.

Stanford's excavations at Midsummer Hill, if not providing certain evidence for ore mining in Dean from the 5th century BC, at least prove 'local' iron-working for that period.

As elsewhere in Britain it is to the later Iron Age that one must turn for more substantial evidence of a local iron industry.

SUDBROOK CAMP (ST 505 873) See G56.

The promontory fort at Sudbrook, Gwent, is located just four miles from the southernmost tip of the Forest of Dean, on the Severn estuary at a very ancient crossing point. Excavations by Nash-Williams in the 1930s revealed iron slags and charcoal dating from 1st century BC iron-working. The fort has been much eroded by the tidal river (Nash-Williams VE. 1939).

COLEFORD - High Nash (SO 57680 10155) See G16.

In 1987, during rescue excavations, an iron sword, which when complete would have been close on a metre long, along with the remains of an iron shield boss and three bronze rings were found in a ritually deposited burial. The sword had been bent double. The rings, decorative fasteners for a sword belt, had been placed upon the shield. One of the rings had a thick stud or button on which was enamelled a unique design in red.

Dr. Graham Webster identified the rings as belonging to a Celtic warrior of the late La Tène period and providing a link between the late La Tène examples found in western Europe and those adopted by the first-century Roman army which were flat-faced and undecorated (Webster G. 1990).

No traces of human remains were found with the deposit which had been sealed in and beneath highly acid clay. The artefacts were close to an ancient well/spring and within the projected temenos of a later Roman temple site. Their burial was clearly of important symbolic significance to the local inhabitants in the immediate pre-Roman period in Dean. The sword and shield boss represent two of the very few iron artefacts which, with a strong presumption, can be proposed as having been manufactured in Dean in the pre-Roman period (See Walters B. Rescue Excavation at High Nash, Coleford (forthcoming), Walters B. in Sindrey G. 1990 and Walters B. 1992).

LYDNEY PARK (SO 6160 0265) See G50.

Wheeler, during his excavations, found an iron spearhead of an early Iron Age type 'which might be of any date within the last three or four centuries BC'. From the limited evidence he had available he could only say with certainty that the site was occupied from the 1st century BC (Wheeler & Wheeler. 1932). Again it is reasonable to presume local production.

ARICONIUM (Weston-under Penyard CP) See G93.

Ariconium is certainly best known as a Roman-period iron-working

settlement but its function, or even existence, in the pre-Roman period has been questioned. Until recently the only evidence for a late Iron-Age settlement lay in the discovery of several Celtic tribal coins which are believed to have been in circulation for several decades.

Prof.C.F.C.Hawkes argued for an early Roman introduction to the site (Hawkes in Clifford EM.1961). Latterly, Stanford supported the view that Dobunnic coins found in Herefordshire and Gwent were the result of dispersion during the course of the Roman conquest (Stanford SC. 1980). These are still valid opinions as far as the coins are concerned, but they may be questioned:

For example: In 1958 a Dobunnic uninscribed silver stater was excavated from 'a level below the earliest Roman road' at Dymock. It was clearly deposited before the early Roman military road from Kingsholm, Gloucester to Stretton Grandison and beyond, was constructed. Dymock is only six miles north west of Ariconium so Celtic coins were circulating in the area prior to the Roman conquest. A Gaulish gold coin of the Baiocasses, also found at Dymock, was minted around a century before the Romans crossed the Severn, as was a copper coin of the Gaulish Sequani, found at Ariconium.

Of similar date was a billon coin of the Coriosolites (a tribe occupying the Channel Islands and parts of NW Gaul) found at the Bream Scowles. A further Gaulish tribal copper coin, of Massalia, was found 'near Ross-on-Wye', probably at Ariconium. It too would have been in circulation for around a century (See: Haselgrove C. 1977 and Allen D. 1975).

The Celtic coin evidence can equally support a pre-Roman settlement as Graham Webster deduced: 'The site has, however, produced no less than 27 British coins..... and the evidence points towards the existence of a pre-Roman settlement, possibly connected with iron workings.' Dr.Webster was also aware of a proto-rosette type brooch from Ariconium. They are rare in Britain and date from c20 BC - AD 30. The

brooch is now in Gloucester City Museum, Accession No.1618 (Webster G. 1981). Despite differing on the coin evidence, Stanford also concedes that Ariconium 'may have developed on a pre-Roman industrial centre'.

More positive evidence for pre-Roman ironworking was produced by Garrod and Moss in 1967 when a small rescue excavation at SO 645 241 revealed the cross-wall of a later Roman building that had partly damaged the remains of five bowl-type furnaces. The furnaces had been cut down from the old turf line. On the same level was found a 1st century AD penannular brooch and a sherd of Native-Ware fabric (Garrod AP & Moss PA. 1967; 1968 and Garrod AP & Bridgewater NP. 1968).

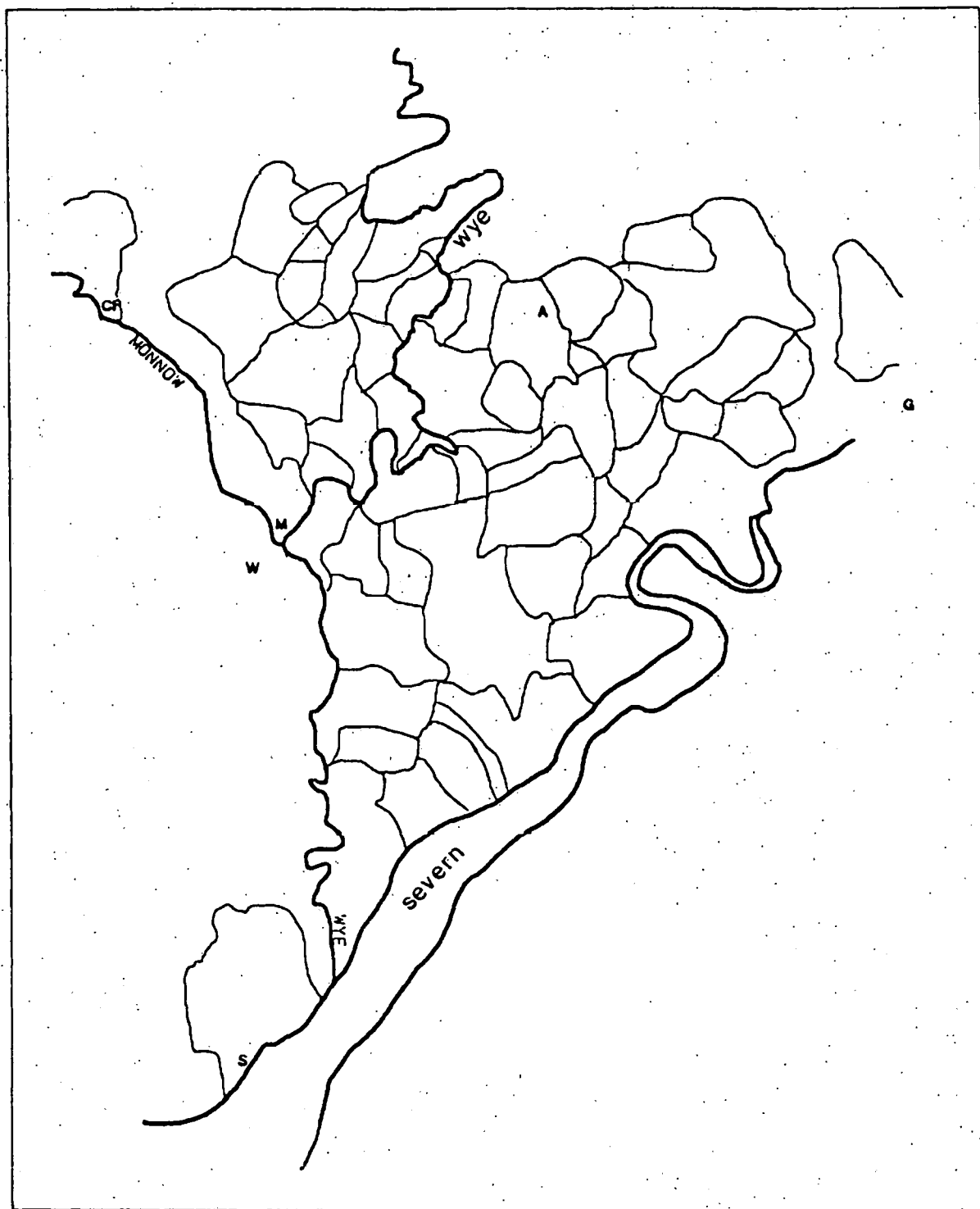
Recent field and aerial surveys by Dean Archaeological Group have demonstrated that a pre-Roman iron-working settlement in an area centred on SO 6470 2385 preceded a new, early Roman-period, military-controlled iron-working site at SO 6415 2470 which lies one kilometre to the north of the late Iron Age settlement.

Fieldwalking on the native settlement 1988-91 has produced two 'Langton Down' type brooches, a La Tène II type brooch, a Rhenish 'Eye' type brooch and two 'Nauheim' derivatives, all manufactured before the Roman invasion of this area west of the Severn. Late in 1991 a bronze core of a gold-plated Dobunnic stater was found with a Dobunnic-type horse on one side, and with the other side blank. It may well have been of local production.

Numerous varieties of late Iron Age type Native-Ware pottery, fired under reducing conditions, have been gathered and excavated over the same period with a wide variety of rim forms hitherto unknown west of the Severn. None of them appear to derive from the Gloucestershire Cotswolds although a few are representative of Malvern wares (Walters B. Ariconium Monograph, forthcoming, Walters B. 1992). DAG AERIAL SURVEY 1990 recorded on Films 21,23-25).

The evidence for a pre-Roman iron-working settlement at Ariconium,





#### ROMAN MILITARY SITES

G = Gloucester      A = Ariconium      M = Monmouth      W = Wonastow  
C = Castlefield, Kentchurch      S = Sudbrook

## 10. THE ROMAN IRON INDUSTRY IN AND AROUND DEAN

### 10.1 FIRST CENTURY IRON PRODUCTION FOR THE ROMAN MILITARY

Circa AD 49/50 Ostorius Scapula was ready to engage Caratacus. It may be assumed that he would have instructed part of his fleet to seal off the Silures coastal seaboard along the Severn estuary and the Bristol Channel. His base, probably at Kingsholm, Gloucester, would have been well supplied and the Sudbrook camp may have been utilised as a coastal supplies depot. Artefactual evidence from Sudbrook supports the presence of a Roman military force there in the Neronian period, and possibly before the death of Claudius (Manning WH. 1981, Webster G. 1981).

A 30 feet wide paved road was constructed from Kingsholm directly to Dean. This is Margary's route number 61 and is 10½ miles long. An excavation across it produced a local copy of a Claudian As in the primary level, sealed beneath secondary metalling (Trans. BGAS.1978,84 and Margary ID.1967). These irregular coins, modelled on the official issues of Claudius, are commonly found on early military sites, including Kingsholm, Sudbrook, Ariconium and Castlefield, Kentchurch, and circulated mainly between AD 48 and 64 when the official supply of coins was either very limited or non-existent (Kenyon R. & Reece R. 1985 & Mattingly H. in Nash-Williams VE. 1939).

Although dating one section of a road need not imply that the whole length was constructed at the same time, in this instance it is difficult to view it otherwise. The road is a relatively short length for a Roman road, less than 11 miles (16km). It is also the only road running directly west from Gloucester.

At what is now Mitcheldean this length of primary road was connected to an 8 feet wide road, possibly upgrading an existing forest-edge trackway with simple paving and kerbing. This strategically important road, providing both a communication and a supply route from the Severn to Ariconium, is now known as The Dean Road. Its much repaired

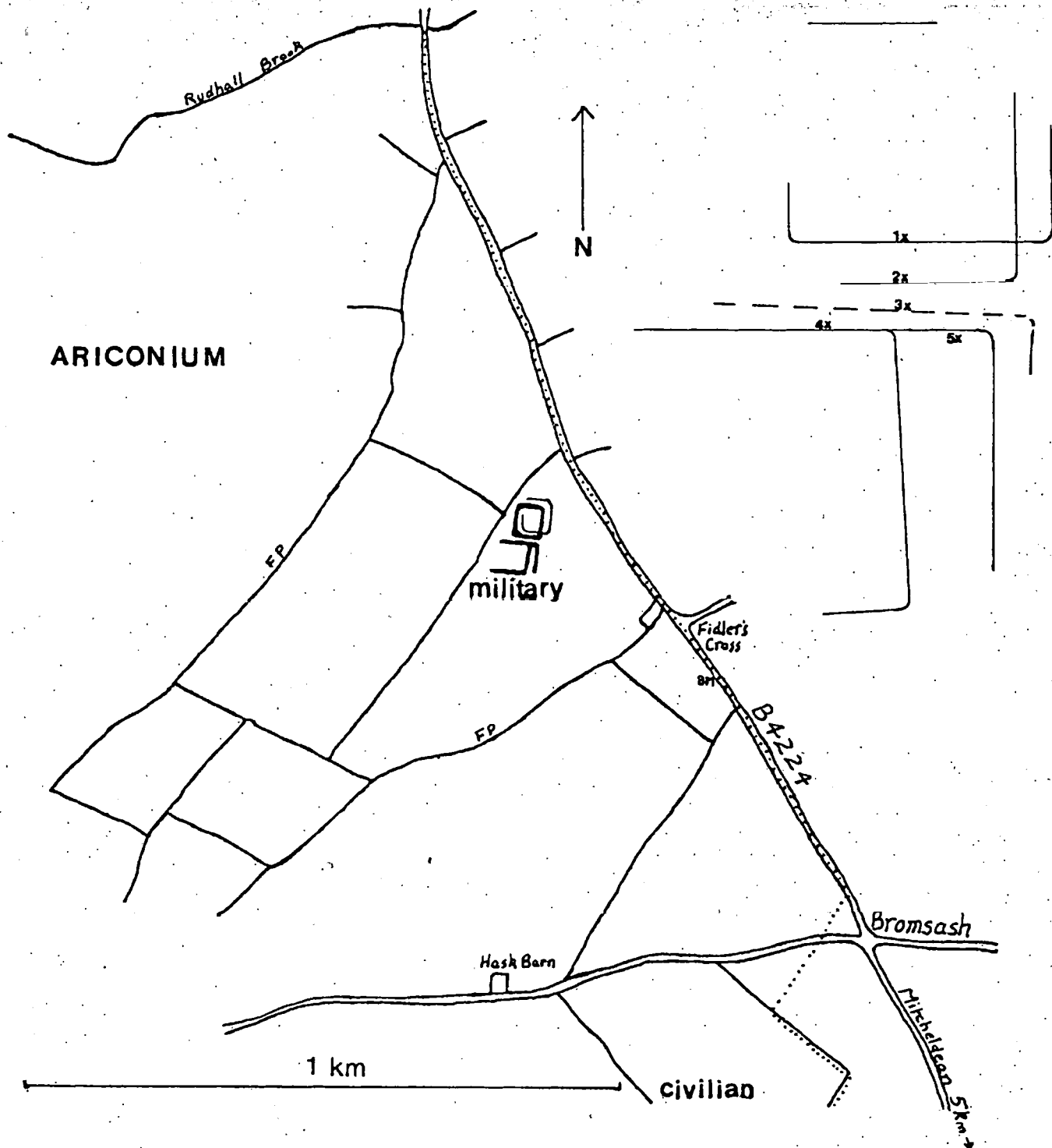
and reconstructed paving can still be traced for miles through the Forest of Dean (Margary route 614).

Between Mitcheldean and Ariconium route 614 links to the massive iron ore outcrops on Wigpool Common and runs for miles immediately below the ore outcrops on the east side of the Forest.

Although to Scapula must be given the credit for establishing the first temporary forts west of the Wye before AD 52 when he died, his successor Didius Gallus is usually credited with the consolidation of the fort network and construction of supply roads between 52 and 56. It is, however, a reasonable conjecture that some of the key roads between the rivers were of Scapulan construction. Without them he would have had no easily discernible communication links with his flanking fleet and army detachments along the Severn, nor with his XIVth legion operating further north.

That his intention was to take immediate control of the Dean iron industry and organise it for his military requirements is a logical and reasonable assumption. That the Bury Hill, Ariconium iron-working settlement was to feature large in his plans is also evident by the road link to that area. It would have been unthinkable to advance into Silures territory without a massive supply of nails for rapid timber-fort construction - a supply that would need to be continuous for some time to come. Expendable weapons such as spears, javelins, arrow-heads and ballista bolts would need constant replacement. All were made from iron and Dean was the logical source of supply now that the army had advanced so far west of the Weald.

Around this time the Mendip's lead industry also came under Roman control. This is borne out by inscriptions stamped on lead pigs deriving from the area. They continued to produce lead throughout the first and second centuries. Concerning iron McWhirr observed: '... no doubt the iron deposits in the Forest of Dean were placed under military control initially' (McWhirr A. 1981).



Plan of the Bromsash area showing the relative positions of the Ariconium military site centred on SO 6428 2388, and the Bury Hill settlement site centred on SO 645 229.

The B4224 is a Roman military road, Margary Route No.613 which continues south through Mitcheldean as the 'Dean Road' (Margary Route No.614), eventually to join with Margary Roman road No.60A close to the Severn estuary.

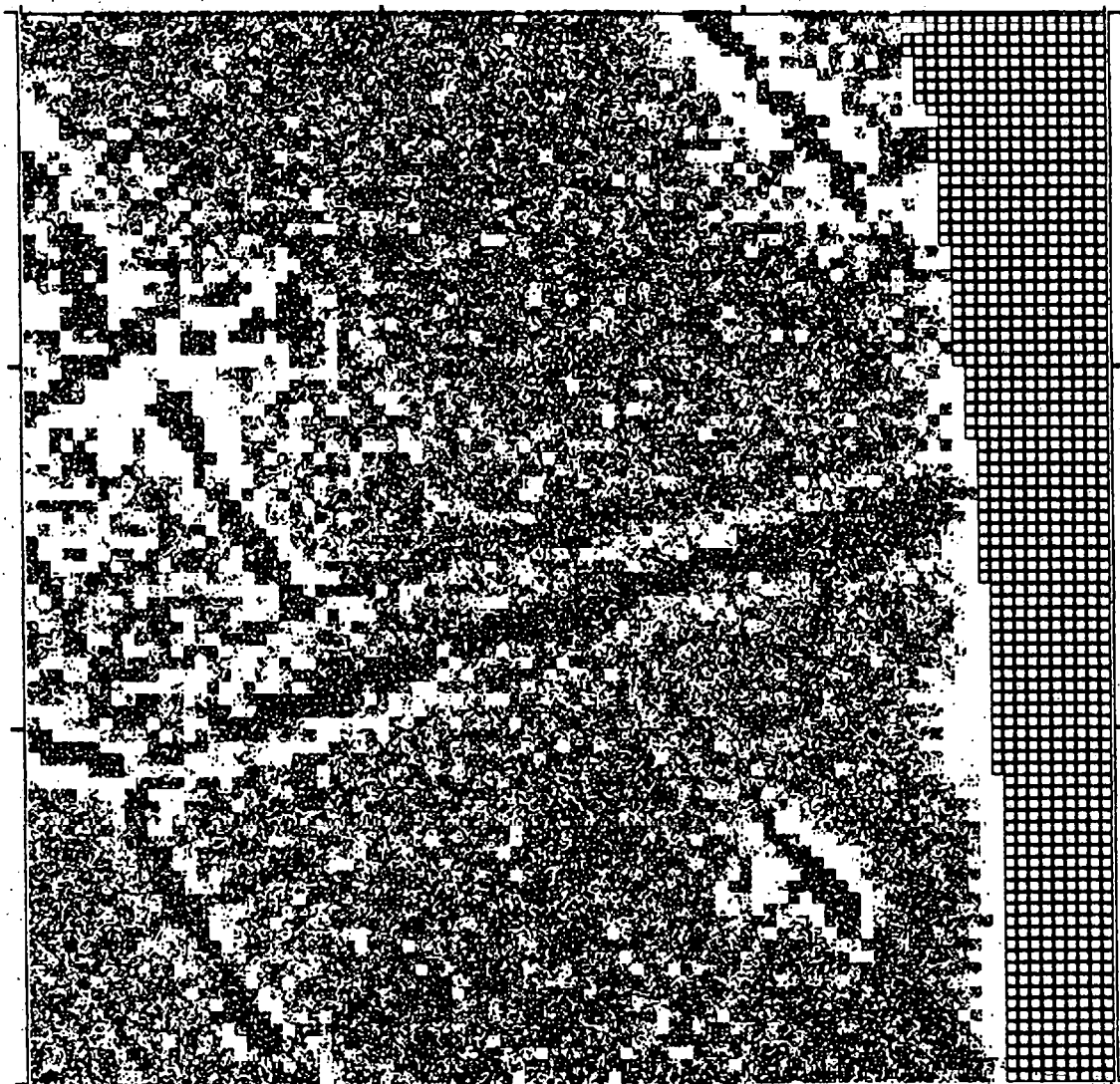
INSET, top right: The site plan as deduced from the aerial photograph taken by Mark Walters on the 24th of June, 1989, at 6pm from a height of 1,500 feet.

Metres  
0

30

60

90

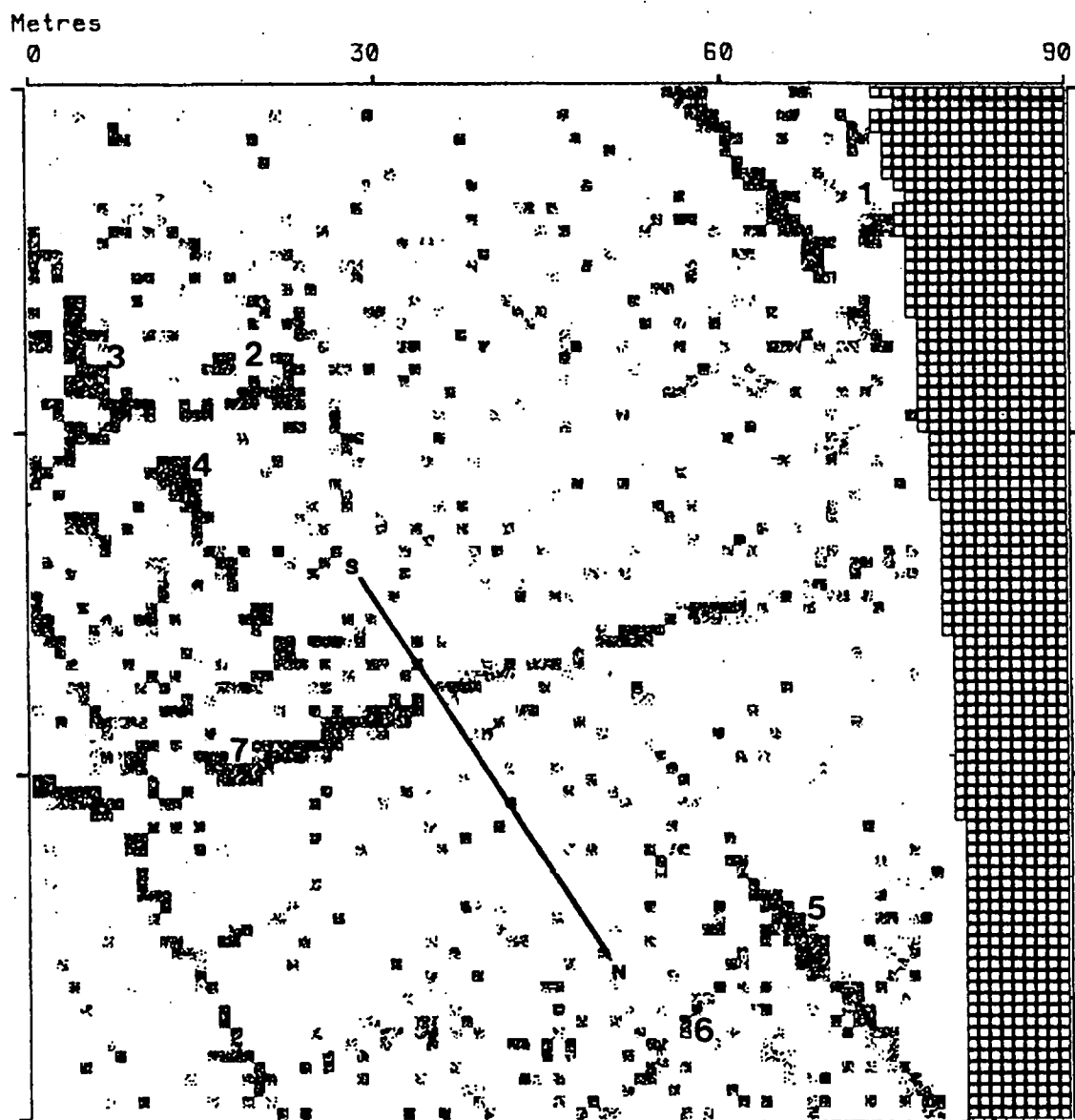


ARCONIUM MILITARY SITE - MAGNETOMETER SURVEY RESULTS - 2 April '90

Survey by: P.D.Catherall

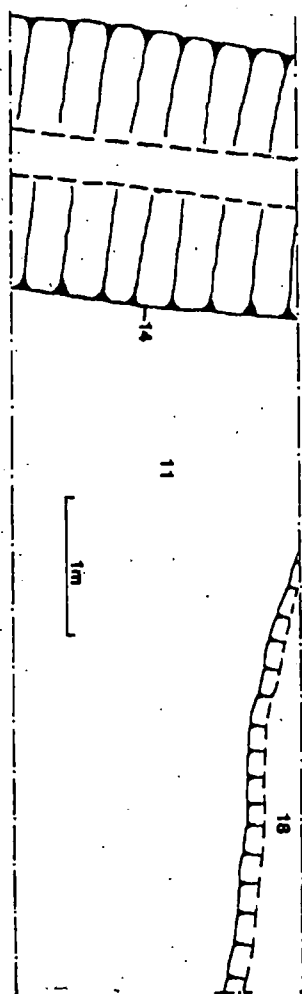
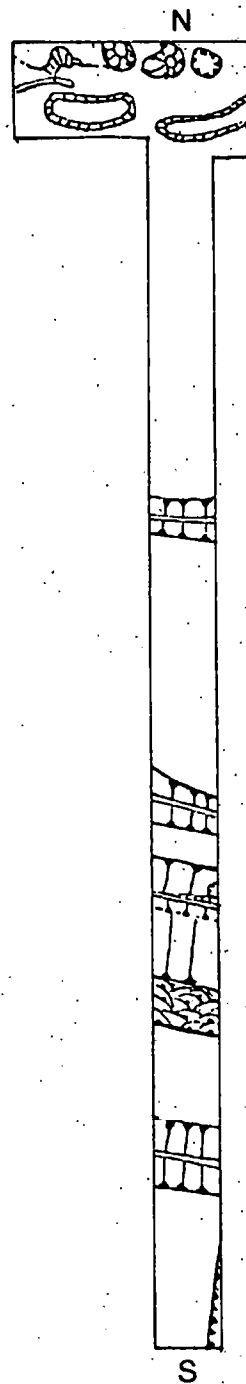
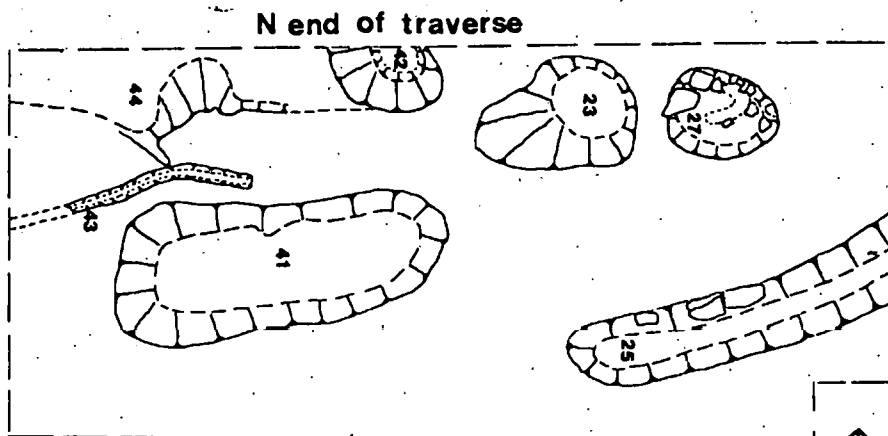
The sheer density of this survey print-out is indicative of the large quantities of 'floating' iron slag fragments throughout the top-soil, however, the major magnetic anomalies produced by the ditch features clearly show through.

Survey results by kind permission of P.D.Catherall.



This print-out has eliminated most of the weaker magnetic anomalies caused by the 'floating' slag, thus enhancing the strongest features. Areas surrounded by numbers 2,3 and 4 are of particular interest. Area 1 appears to be outside of the enclosure ditch, however, one must be cautious here because the wide, intrusive ditch, numbered here as feature 7, continues beyond the hedgerow through into the next field. The feature numbered 5 appears to be in one of the fortlet ditches. 6, a straight line (gully ?) running into the interior of the fortlets at an oblique angle, is doubly anomalous. The position of the 40 metres long excavation traverse has been drawn in.

Magnetometer survey by P.D.Catherall.



S end of traverse

1m

N

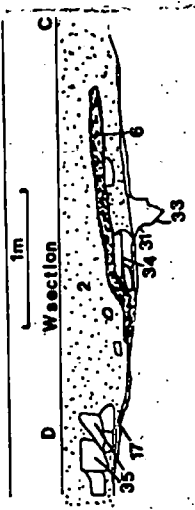
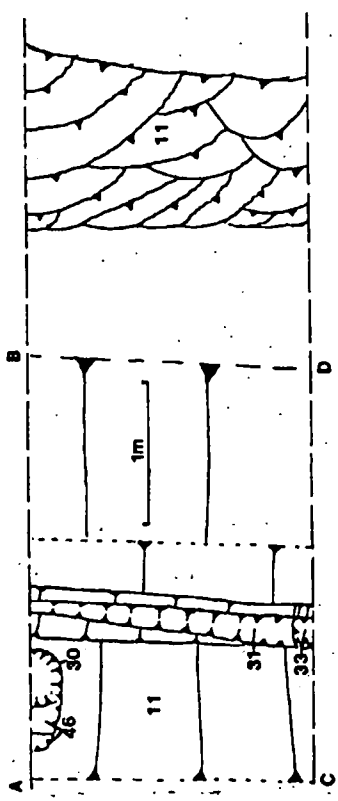
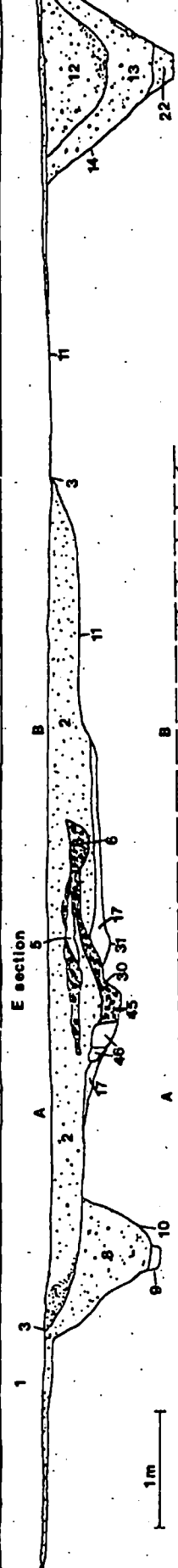
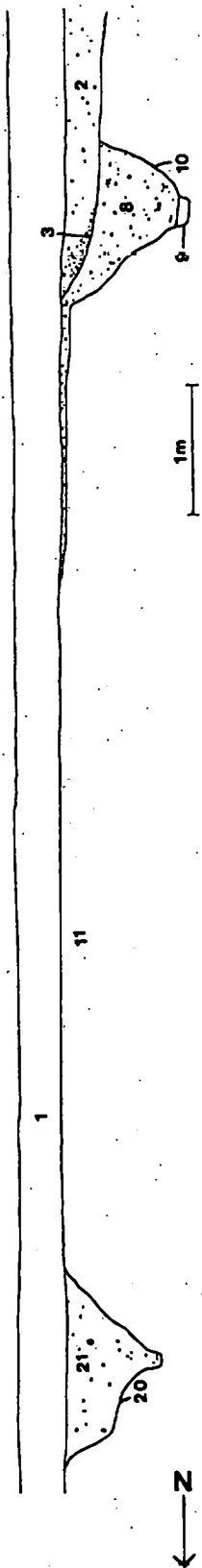
11

11

1m

18

20





## 10.2 ARICONIUM (Weston-under-Penyard CP. Herefs.)

A military site near Ariconium was identified in June 1989 by Mark Walters during an aerial survey on behalf of Dean Archaeological Group.

Almost a decade earlier Dr. Graham Webster had observed about Ariconium: 'The only hint of a military presence are the two Claudian imitation coins, and two fragments of samian form 24/25, of Claudian-Neronian date. The deposits of iron ore would certainly have been of interest to the Roman army. A possible site of a fort would be to the north of the settlement, overlooking the Rudhall Brook (Webster G. 1981). This is precisely where Mark located, not a fort, but two overlying square fortlets adjacent to a complex of what looked like larger native enclosures, all of them on high, flat ground overlooking the Rudhall Brook and 1 Km north of the known Ariconium settlement.

Over the past decade, the evidence for a nearby Claudian - Neronian military site has increased with many more surface finds of samian dating to that period as well as a number of brooches of a type usually described as having been introduced by the Roman military at the time of the invasion.

In September, when the crop had been removed, permission was granted to walk the field in which the crop marks had been discerned. It proved to be strewn with iron-working debris, smelting and smithing slags, baked clay and charcoal dust over an area of about 250 metres square and running on through a hedgerow into a field that was pasture land. The pottery rims and sherds collected from the surface were almost all of a 1st century AD gritty Severn Valley Ware fabric, both reduced and oxidised. A number of black Native-Ware sherds from the late Iron-Age tradition were also present. Enough to suggest a clear 1st century date for the site, but insufficient to prove a military presence or closely date it.

A geophysical survey, conducted by Phil Catherall with a magnetometer,

confirmed ditch positions but also located a number of major magnetic anomalies which are likely to be smelting furnaces or smithing hearths. As the survey print-out shows, it was not possible to survey the whole of the site in the time available, neither was it possible to survey the field that was laid to pasture and into which major ditches run (See No.1 on graph).

At the beginning of October a 40m long by 2m wide section was cut, positioned so that four different enclosure ditches were sectioned in the one traverse.

What were presumed to be military ditches were sectioned first. Both were rock-cut, V-shaped, with a slot at the bottom.

The finds included pottery in early Severn Valley Wares and of fabrics and forms that could be paralleled in the early phases of the Kingsholm fortress. Seven different forms of Native-Ware jar rims were recovered, three of the forms finding parallels on early military sites at Kingsholm, the pre-Flavian fortress at Usk, and at Sudbrook camp. Other stratified finds from the ditches included whet-stones, primary smithing slags and part of a sand-stone mould with a circular moulding area which would have been 18 cm in diameter and 4mm deep. Less than a quarter of the moulding area remained so little can be said with certainty about what was moulded in it except that it would have been circular at its outer edges.

A third broad ditch had cut away the top of one of the military ditches so was clearly later and had remained open for some time.

The lowest stratified finds included an Aucissa-type brooch, frequently found on Claudian-Neronian military sites in Britain and generally accepted as being introduced into Britain by the Roman military. The pottery finds were similar to those of the earlier ditches except that many sherds of Dressel 20 amphorae were included. Perhaps the most important of the finds was a broken spear/javelin tip which was fused to highly magnetic secondary smithing slag. The socket

had been 'knocked-off' giving the impression that it had 'gone wrong' in the manufacture and had been disposed of in a slag pit. The slag was later re-deposited into the ditch as fill. It provided circumstantial evidence for weaponry manufacture on site.

The spear head was easily paralleled in the British Museum collection as a Group 1A produced for/by the Roman military in the mid-1st century (See Manning WH. 1985). A Group IIA socketed spear-head was subsequently found as an unstratified surface find along with a quad-lobed missile point. A socketed leaf-shaped spear-head was recorded among the finds from an earlier excavation (Jack GH. 1923).

The fourth ditch belonged to, what is believed to be, a large iron-working enclosure. It was a perfect V-shaped rock-cut ditch, 190cm wide and 112cm deep with a flat bottom. It contained only Iron-Age type Native-Wares including a rare lugged vessel that had Durotrigian parallels but which was of a local fabric. Slags included tapped bloomery slag and highly-magnetic smithing slag.

The first two ditches excavated were deemed to be pre-Flavian as was, probably, the earliest cut for the third ditch. The latter began to be filled during the Flavian period, and was not completely levelled until around the turn of the century (Walters B&M. 1989).

#### SUMMARY OF EVIDENCE

Any opinions expressed here must be tentative in view of the limited evidence assembled from aerial survey, geophysical survey, field survey and a 40m x 2m exploratory excavation.

There is sufficient evidence to suggest a military presence in both the pre-Flavian and Flavian periods and that it was connected with iron-working.

The question as to what purpose the fortlets served is in need of

further consideration and clarification. Meticulous area excavation will be necessary to reveal further evidence from within the fortlets, especially as determining which features belong to which period of occupation will be far from easy. There is only a thin lens of surface build-up between the two occupations and working in wet weather would so damage the occupation surface that determination would be impossible. The proximity of bed-rock and clay lenses aids water retention and makes dry weather excavation imperative.

Although using the term fortlet one would hesitate to suggest them as policing posts. Neither are they marching camps. The quantity of pottery retrieved from the second ditch excavated belies a very short stay.

Each fortlet encloses an estimated 2,500 square metres, about .6 of an acre, comfortably enough for a century of men and perhaps enough to control an acquiescent, disarmed work-force, if indeed, this was necessary. The evidence, however, from the native settlement site a kilometre away, and, as we shall see from other native village settlements within Dean, suggests that the local population may have been receiving 'benefits' from the Romans in return for unforced and willing labour.

Perhaps then the fortlets might be viewed as modest-sized military administrative centres, staffed with a minimum of man-power and supervising the production, supply and distribution of artefacts and some forgeable iron bars to advance military forts.

One possibility that cannot be ignored regarding the early administration of the Ariconium iron industry is that, under the cover of the military, Roman civilian entrepreneurs were allowed, or encouraged to move in as middle men who profited from both the British producers and the military commanders who may have preferred to deal with them rather than the natives (pers. comm. with Professor P. Salway and Dr. H. Cleere).

## PERIODS OF HIGH PRODUCTION

Massive production of nails for rapid fort construction probably dominated requirements during the ten years c.AD 50 to 60. Scapula's initial attempts to establish a frontier beyond the Wye, were followed, from 52-56, by Didius Gallus' consolidation of his gains and, almost certainly, the construction of a new fortress supply base in a forward position at Usk (Manning W.H. 1981). The Castlefield fort would appear to be of Claudio-Neronian foundation (see G26) based on the plentiful Form 29 samian pieces recovered from excavation. Very recently, during the summer of 1992, a new fort site has been revealed during excavations at Monnow Street, Monmouth. On present evidence it is also of pre-Flavian construction (Pers. Comm. with S.Clarke). Further advances by Quintus Veranius in 57/58 and Suetonius Paullinus in 59/60 would have demanded full production for this period.

During the 60s the 2nd Legion were active in Dumnonii territory (Devon and Cornwall), a fortress was established at Glevum (Gloucester) and, soon after the end of the decade, Petillius Cerealis and Agricola were involved in Brigantian lands.

The Flavian period saw renewed activity west of the Wye. In AD 74 Julius Frontinus became Governor and established Caerleon as a new fortress base for the 2nd Legion c.75. By 77 the Silures were finally totally subdued to be followed by the Ordovices and other north Welsh tribes in 78. By 79 the whole of what is now known as England and Wales was at last under Roman control, thirty six years after the invasion by Claudius.

In summary: The 50s would have been a time of intensive iron production. The 60s would have seen a demand for products to satisfy the orders for Glevum's fortress needs. From the mid-70s military requirements again came uppermost and one would expect to see a surge of activity reflected in excavated evidence.

## ARICONIUM'S SOURCES OF IRON

Just three miles south of Ariconium, where the Forest scarp rises above the Herefordshire Plain, is the rich Wigpool ore-field (G40). All commentators agree that this area must have been the principal, if not the sole, source of ore for the Ariconium furnaces in the pre-Roman and during the Roman period. The steep route down, past Cornage Farm, connects with the Dean Road between Mitcheldean and Ariconium.

No obvious major smelting site has yet been identified at the ore source and there appears to be little doubt that virtually all of the ore mined from Wigpool was transported to other sites for smelting. Paul Wildgoose's estimate of 600,000 tonnes of ore extracted from surface workings alone during the Roman period is proposed as an absolute minimum based on measurements of observed and accessible pits (Wildgoose P. 1988). The true amount is probably in excess of this.

That smelting of crude ores at Ariconium during the 1st and 2nd centuries AD was the primary function of a comprehensive iron industry seems beyond dispute. Furnace bloomery slag is everywhere although frequently mixed with primary smithing slags. The distinctive slags shaped by the furnace tap-hole in which they were entrapped, cooled and hardened allow a fair estimate of the diameter of the tap-hole and, at the same time, the thickness of the furnace wall. They are present on all of the iron-working areas and measure from two to three centimetres in diameter and from eight to nine centimetres long. These tap-hole slags are very different from the thin, pencil-like trickles from primary smithing hearths, and are not to be confused with drip columns that form outside of furnaces below the tap-hole. Fragments of crude ore are likewise to be found wherever there is slag.

### 10.3 SUPPLEMENTARY SMELTING AT VILLAGE SITES IN DEAN ?

There is now evidence that a small number of settlements within north Dean were smelting ore for a limited time following the Roman occupation in the mid-1st century.

GREAT HOWLE (G89) is 5km south west of Ariconium and 3km west of the Wigpool ore outcrops. A closer source of ore is to be found at Drybrook (G14). At Great Howle there are the remains of a timber building within an enclosure bank. Within and outside of the enclosure are substantial deposits of bloomery smelting slag. Cinderbury Wood is close by (G90). All of the many artefacts recovered from within the enclosure are unequivocally of first century AD date. The pottery is predominantly of early Severn Valley Ware fabrics and forms. Black Burnished ware (BB1) is absent. Samian ware is of South Gaulish manufacture and includes a decorated section of a Form 37 bowl of early Flavian date. Other artefacts include an amber glass bead with blue and white cables (Guido Class 9c) of 1st century date and of the Iron Age tradition, and a mid-1st century type 'Dolphin' brooch of c.AD 45-60. No secondary smithing material is present on or near the site which was abandoned in the later first century (Walters B. 1985, 1987 and 1988).

RUARDEAN (G68) is 1.5km south east of Great Howle from which it is visible across a valley down which flows the Lodge Grove Brook into the Wye. The ironworking site is 1km west of the Drybrook ore outcrops and 2km from Wigpool. The bloomery smelting slag deposits extend for some 60m by 10m along a hedgerow and into the next field which is now a recreation ground. Aerial photographs show, from parch marks, that the slag spread is even greater beneath the recreation ground with possible associated buildings. The surface pottery finds are all of first century Severn Valley Ware forms and fabrics and closely match the pottery from Great Howle. The pottery fabrics from both Great Howle and Ruardean closely match the first century AD SVW fabrics from Ariconium. No secondary smithing slag was apparent in the field surveyed.

DRYBROOK (G14) is 6km south of Ariconium and on a Roman road with a connecting road to Ariconium. It is close to Wigpool but has its own ore outcrops. Only one of the scowles is still open, the rest are filled in and visible on aerial photographs. Romano-British pottery, associated with the outcrop area, is exclusively of first century AD fabric and form. This evidence has been gathered from excavation and from pottery revealed during a gas pipeline installation adjacent to the site. Bloomery smelting slag is beneath fields and gardens below the outcrops.

ASTON INGHAM (G3) is 3km east of Ariconium and has its own small outcrops of ore in the Wenlock Limestones although there is no evidence that they were mined during the Roman period. Aston is 3.5km north west of Wigpool. A very large fourth century coin hoard from the village suggests the presence of an unlocated building in occupation during that century. The field at SO 681 239 is strewn with bloomery smelting slag and exclusively 1st century SVW pottery. The forms and fabrics match those from Ariconium, Ruardean and Great Howle. The field is close to the village church and has received regular ploughing. It would appear that the slag and pottery has been dispersed from a point at, or close to the above grid reference.

HUNTLEY (G25) is 8km from Ariconium. Round Hill lies in the fork of two Roman roads. It is the point where Route 611 forks to Ariconium away from the straight alignment of the Kingsholm to Mitcheldean road. There is a first century AD occupation site on the Hill round which aerial photography has revealed a series of clay extraction pits. One of these, adjacent to the site, was excavated in 1988. It had been back-filled with tapped bloomery slag and baked clay fragments. It also contained 1st century SVW pottery sherds and a limestone-tempered rim of a black Native-Ware jar. Surface pottery finds are exclusively of first century date. There is a concentration of tapped bloomery slag with associated baked clay fragments.



SYMONDS YAT HILL FORT (G21) has also produced exclusively first century AD Severn Valley Wares along with black Native-Ware jars from the Iron Age tradition. They were associated with tapped bloomery smelting slags. The evidence was revealed by a fallen tree which lifted a 3m long section to bedrock. Subsequent excavation in advance of Forest Enterprise visitor facilities, by the Gloucestershire County Archaeology Unit, confirmed the evidence. No secondary smithing slags were discerned. Further excavation and the discovery of distinctive Claudian/Neronian/Flavian pottery would be necessary before the smelting could be confirmed as immediately post-Roman as there is growing evidence that some orange-coloured Severn Valley Wares were being produced locally before the Roman occupation (Timby J. 1990).

The absence of secondary smithing/forging material on and near these sites would seem to indicate that the iron blooms were transported elsewhere for smithing. If some or all of these sites continued to smelt after the Roman occupation (Great Howle certainly did) then it may have been permitted or encouraged by the Romans in order to supplement the iron being produced at Ariconium in the face of extraordinary military requirements.

None of these small settlements survived as such beyond the later first century AD.

At this juncture the questions might be asked: During this time of urgent and intense military expansion, were the ore-smiths at Ariconium able to produce sufficient iron from their own smelting to meet military requirements ? What might have been the extent of the demands for iron ? Once the forgeable iron was produced what might have been the manpower requirement to satisfy these demands ?

Before attempting to answer these questions it would be as well to consider the basics of what is known about Roman-period smelting slags that have been analysed from sites in and around Dean.

The amount of metallic iron lost from the crude ore as a flux during

smelting can be determined from an analysis of slags from the site. Harris H. in Jack GH. 1923, analysed three representative specimens of slag from Ariconium. The first, a piece of entrapped tap-hole slag had a content of 60.7 metallic iron. The second yielded 50% iron and the third 47.75%.

A chemical analysis of tapped slags from the Severn foreshore, all probably Roman-period, varied in their metallic content from 52.80% to 84.16%, the average content of the twelve slags analysed from the eight sites being 71% (Allen JRL & Fulford MG. 1987).

The only other Roman-period slag from Dean to receive analysis was from a shaft-type furnace smelting site at Barnfield on Hangerbury Hill (G16 and 13.1). A slag sample taken from the flow well below and away from the tap-hole proved to have a metallic content of as much as 78% (Walters B&M. 1987).

What this indicates is that between 50% and 80% of iron in these samples was lost in the smelting process to slag. Put another way, 100 lbs of crushed ore could produce between 20 to 50 lbs of iron. In practice the yield would have been considerably less because the iron bloom, once removed from the furnace, still held encrusted and entrapped slag which could only be removed by re-heating and hammering, which process caused a further reduction in iron.

Henry Cleere estimated that the average bloom weight from the Holbeanwood furnaces in the Weald was probably 20-40 lbs. Blooms from Cranbrook in Kent, re-worked into solid blocks of metal weighed about 2lbs each, 10-20 of them being the ready-to-forge products from a single smelt. Dean's smithed blooms have weights between 2½ lbs and 5½lbs, the heavier ones being circular 'bun' shapes and not yet confirmed as of Roman date (Cleere H. in Strong & Brown 1976).

Relevant to this discussion was the discovery of around one million nails within a fabrica pit at the incompletely constructed Inchtuthil Legionary Fortress, occupied from AD 83-86. Professor Manning, who

reported on the iron objects, observed that the hoard '... contained both unused nails in stock at the time of the demolition and used nails collected during the demolition' (Manning W.H. 1985 in Pitts & St.Joseph), however Dr.Cleere is of the opinion that most of the nails had not been used (Pers. Comm. with Dr.Cleere 12.8.92). Cleere demonstrated that the manufacture of these nails from worked blooms would have consumed around 50,000 man-hours of time. Based on reasonable assumptions this meant that it would take fourteen smiths one year to forge these nails (Cleere H. 1985 in Pitts & St.Joseph).

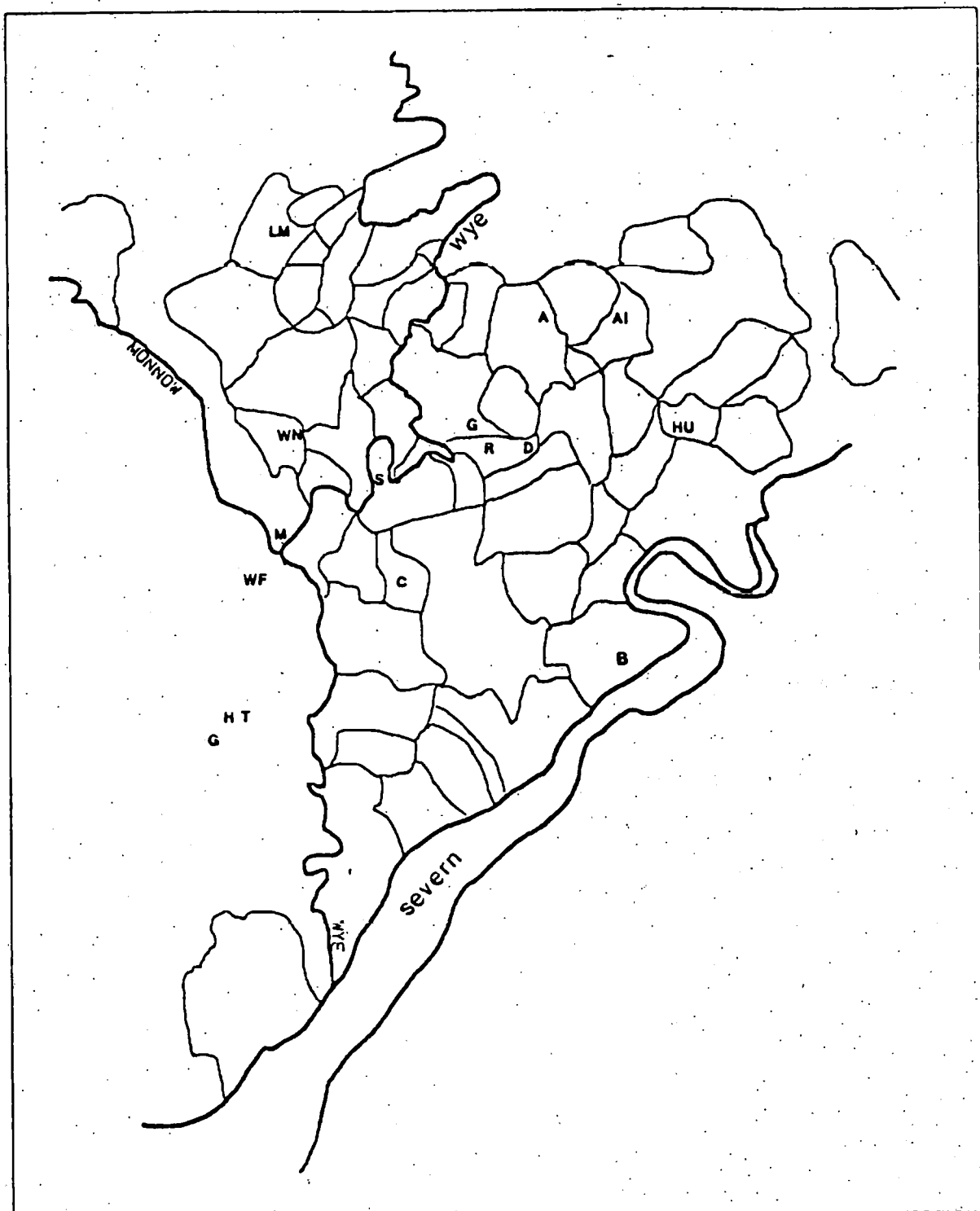
The residual nails at Inchtuthil weighed 7 tonnes. Allowing for the production of average-weight unworked blooms of 30 lbs, it would take upward of 500 furnace smelts to produce the iron needed to forge the one million nails, or more than 7000 two-pound-weight forgeable bars.

Unfortunately, of course, it is not possible to ascertain how many nails were actually used in the fortress construction along with its adjacent compounds. It has also been suggested that the residual nails may have been intended for further fort construction with Inchtuthil as the supply base.

When we consider that two fortresses and upwards of ten forts were constructed under Scapula, Gallus, Veranius and Paullinus, within the South Wales and southern Borders region alone, in ten or eleven years from AD 48 then we are perhaps looking at the need for in excess of 20,000 worked blooms to be produced, for nails alone.

To this quantity must be added the blooms required for the manufacture of replacement weaponry.

One must also consider the possibility that Dean supplied the nails for fort construction along the central and northern borders where the XIVth Legion was operating. The total demand is incalculable at this point in time. From present evidence, though, it would appear that Ariconium was the sole manufacturing centre for iron artefacts in the west during the pre-Flavian period. Recent evidence, as will be



# FIRST CENTURY IRON-WORKING SITES

A = Ariconium

AI = Aston Ingham

D = Drybrook

G = Great Howle

HU = Huntley

R = Ruardean

M = Monmouth

WF = Wonastow Fort

B = Blakeney

C = Coleford

S = Symonds Yat Hillfort

WN = Welsh Newton

LM = Lower Monkton

T = Trellech

G = Great Crumbland

H = Hygga

demonstrated, indicates that Blestium (Monmouth) joined Ariconium as a production and distribution centre early in the Flavian period, probably about AD 75, when Roman military expansionist policies were vigorously renewed in Wales resulting in the construction of scores of new forts and their inter-linking communications systems.

#### 10.4 BLESTIUM - MONMOUTH See G45 - G49.

Monmouth is situated on slightly elevated ground, immediately west of the Wye and east of the River Monnow which joins the Wye just south of the town. It was listed in the XIIIth Antonine Itinerary and is 12 miles from Ariconium and 13 from Burrium (Usk). Slag deposits in and around the town are enormous and widely spread. Pile driving at the Wye Bridge (which connects the town with the Forest of Dean) revealed slag deposits many feet below the present river bed although these were not datable. Excavations at Granville street cut through thirteen feet of iron slag layers with sealed Roman contexts. Roman furnaces were revealed there in 1973. Some of the slag in Monmouth was produced during the medieval period but the lowest levels almost everywhere, when found undisturbed, testify to the extensive Roman industry.

Until recently none of the Monmouth town iron-working could be dated earlier than the 2nd century AD even though decorated samian sherds of the Flavian period had been found beneath Monmouth School by A.L.Sockett (samian in Monmouth Museum).

In 1987, during a watching brief at a Burton Homes development in the town centre, a large section of mid-1st century mortarium rim was retrieved from the bottom of the town ditch. The mortarium was paralleled in the Kingsholm military series and was the earliest piece of Roman pottery to be found in Monmouth (see Walters B. Monmouth Roman Type Fabrics - Published by Monmouth Museum in 1987).

The breakthrough came in 1988 when the Monmouth Archaeological Society, tied into rescue excavations on yet another Monnow Street

shop development, invited their colleagues in the Dean Archaeological Group to undertake another rescue excavation in advance of development at the former Glendower Street School. Glendower Street is within the walls of the medieval town of Monmouth and Roman levels could be expected, if undisturbed by medieval development.

The former playground was laid out in five metre square grids. The first area excavated produced 1st century material in the form of a globular flagon and black Native-Ware bead-rim pottery, but no structural features. A second grid revealed 2nd century features well supported by pottery that belonged to the same century; a variety of Black Burnished forms (BB1), Central Gaulish samian and Rhenish beakers plus plenty Severn Valley Ware flat-rimmed bowls and jars. A third reduced-size grid, in a narrow gap between the standing school building and a temporary class-room, overlay a ditch feature into which had been set a perfectly preserved primary smithing hearth alongside a slag pit. The hearth was rectangular, 1.5 metres long by 80cm wide. It was surrounded by vertically placed sandstone slabs, the one at the head being 68cm wide and 38cm deep with a crescent shaped hollow at the top centre, deliberately shaped that way and presumed to be where the bellows were supported. The last charge of fuel was still intact which proved to be charcoal, although the remains of a coal dump were adjacent to the hearth. The clay hearth had been re-cut and re-used on several occasions. From the bottom of the hearth was a slag run which entered a small pit at a slightly lower level. The slag was mere trickles and had probably derived from the re-heating of blooms from which adhering slag had trickled before it had been removed for hammering away internally trapped slag. Alongside was an iron hearth rake.

The hearth was of a 1st century date. The well-stratified pottery included 1st century black Native-Wares which were found in the hearth, in the slag pit and alongside on the ground surface. The ditch bottom produced some Malvern Ware. The pottery forms and fabrics were identical to those found in 1989 in the ironworking enclosure ditch at Ariconium. The Monmouth hearth and the ditch were overlain with a fill

of late 1st and 2nd century material. The later 1st century pottery included several finely-made bowls of Flavian date which were also paralleled in the Flavian period ditch at Ariconium.

An analysis of the coal showed it to be of British Coal 902 rank and extracted from surface outcrops near Berry Hill and Coalpit Hill (G11) in the Forest of Dean which lie close to the Roman road from the Forest to Monmouth and about 5 Km east of Monmouth. They were ideally suited for open hearths and smithing, offering free burning, rapid lighting and long flames with a low sulphur content (See Williams V. 1988).

The hearth, and the smelting with which it was clearly associated, could have been either very early Flavian or pre-Flavian. The absence of Claudio-Neronian samian, or other fine wares of that period, may incline one to date it as early Flavian, however, the more recent discovery of Claudio-Neronian pottery only some 300m away, but outside the town walls alongside Monnow Street, must urge a note of caution.

#### 22-24 Monnow Street

The Pre-Flavian material just mentioned consisted of a scatter of burnt bone, a human tooth, early Form 29 samian, a Neuheim derivative brooch, a penannular brooch and part of a glass bangle. These finds were sealed beneath a 75cm cover of 'levelling-up' layers, possibly ditch upcast. Timber buildings laid on sleeper beams were then erected on the new surface. The excavator proposed that these structures and the small ditch were also probably attributable to the Roman army (Clarke S. 1991 March).

A pre-Flavian military presence has since been confirmed (in September 1992) by the discovery of a fort ditch on the same site. A samian bowl of Form 15/17 was retrieved from the slot at the very bottom of the ditch (Pers. Comm. with the excavator S. Clarke of MAS).

#### COURT FARM AND TALOCHAR FARM, WONASTOW See G43.

This suspected Roman military fort site lies 2.5Km south west of

Monmouth in an elevated position offering extensive views over Monmouth in one direction, and towards Usk in the other direction. The Roman military road to Usk passes the site.

A trial excavation, which took place in 1983, produced a fine collection of Flavian-period pottery including a Form 18 samian bowl, rusticated ware and a number of early Severn Valley Ware type bowls as well as a quantity of Southern Spanish amphorae sherds. A copper As of Nero was also found. Structural features included a shallow rock-cut channel filled with charcoal and burnt daub. Slags had previously been retrieved from plough soil which may have been secondary smithing material (Clarke S. 1983 May and 1984 Feb.).

Further excavation is urgently needed to confirm the earliest phase of this probable fort. Once west of the Wye it is likely that Scapula would have seen the need for a fort in or near Monmouth in order to protect the Wye crossing to the Forest. A military presence may also have been required near Monmouth once Usk became a forward fortress base c.AD 55. Monmouth would have been an essential link in the supply chain of iron products from Ariconium to forts in the south west of Wales.

In summary, at the moment it is unclear whether Monmouth became an additional centre for iron smelting before the Flavian period. The strength of present evidence suggests not although it is now known that there was a military presence there. The inevitable further rescue excavations ahead of development in Monmouth's town centre should clarify its early role as a Roman iron-working centre.



## 10.5 WEST OF WYE FIRST CENTURY IRON-WORKING SITES

These fall into two groups, the first in south Herefordshire where it borders Monmouthshire.

At GWENHERRION FARM, Welsh Newton (G91) smelting slags and furnaces have been identified associated with pottery ranging from Form 37 late Flavian samian to a 2nd century Form 31 dish. Amphorae sherds and BB1 pottery confirm that the activity spanned the turn of the 1st century.

At LOWER MONKTON (G34) S. Clarke (MAS) found 1st century coarse ware pottery associated with several areas of bloomery slag.

At LORDS WOOD (G98) on the lower slopes of the Doward hill, A.L. Sockett excavated much bloomery slag along with a 1st century 'Dolphin' type brooch and black Native-Ware pottery from the Iron Age tradition. Occupation continued into the 2nd century.

WHITCHURCH (G94-97) overlies massive beds of ironworking slags, but, like so many more of the south Herefordshire slag sites, past excavators and fieldwalkers have failed to publish a description and date for most of the associated pottery finds which they found. The only recorded evidence is all second century so, although one may suspect that smelting may have taken place in the first century at Whitchurch, for the moment it must be considered a second century site. It has not been possible to investigate the slag remains. The village overlies some. A dual-carriageway and a service station have been constructed over other excavated sites. The surrounding, nearby fields have not been ploughed since this research began.

This group can be presumed to have obtained its ore from the nearby Doward source and to have supplied Monmouth, rather than Ariconium, with raw blooms or forgeable iron, probably in the Flavian period. They also differ from the Dean sites supplying Ariconium in that the majority appear to have survived into the 2nd century as iron-working sites.

If the ironworking in the parishes of Peterstow, St. Weonards and Llangarron can be proved to be of Roman origin then they would slot into this grouping but their industries would probably prove to be of second century date.

The second West of Wye group is centred on Trellech Gaer which lies 9 Km south of Monmouth just west of the Roman road from Monmouth to Chepstow (Margary Route No.6d) which is the southern section of the primary, long-distance, west of Wye road which connected Wroxeter with the Severn and Sudbrook. The smelted products from this site may have found their way to Monmouth but most likely they went either directly to the Wonastow fort which is 6 Km north west, or to Usk.

The group of sites include Trellech Gaer and Hygga (G77-84) along with Great Crumbland (G85).

Datable finds are exclusively 1st century and include an 'Oldbury' type glass bead (Guido Class 6) black Native-Ware jars, early Flavian Form 29 samian bowls and first century coarse wares. All sites produce heavy bloomery slag deposits and furnaces have been excavated by S. Clarke and the Monmouth Archaeological Society.

BOG ORES have been found associated with the slags and it is probable that this local source was used for smelting. It is highly improbable that Dean ores were transported nearly 15 Km to these elevated sites, the Gaer is 225m above OD.

#### **SUMMARY DISCUSSION OF FIRST CENTURY AD IRON-WORKING EVIDENCE**

1. From circa AD 50 Ariconium became the main centre of iron production and manufacture by, or on behalf of the Roman military. Production continued into the Flavian period on the same site.
2. Some village settlements may have provided supplementary blooms for smithing and forging at Ariconium. Wigpool was the primary ore source.

3. In the early Flavian period, if not earlier, Blestium (Monmouth) joined Ariconium as a smelting and primary smithing centre. The west of Dean outcrops, within 2km of Coleford, were the probable ore sources and coal was obtained from surface sources near Berry Hill and Coalpit Hill.

4. Village settlements in south Herefordshire and in the Trellech area probably supplied Monmouth and possibly some fort fabricas with iron blooms/billets. Local bog ores were utilised at Trellech, Doward ore on the south Herefordshire sites.

5. Coleford/Symonds Yat settlements were possibly also supplying forgeable iron to the Romans from c.AD 50. Their role is still obscure.

#### THE SEVERN SIDE OF DEAN

So far mention has been omitted of mid-later first century iron production on the south side of the Forest even though the vast scowles at Bream are considered, traditionally, to have been mined at a very early date. A coin of the Coriosolites was found there and a hoard of 1st and 2nd century silver denarii which was not deposited earlier than the late second century. Absolute proof of mining in the pre-Roman period or in the first century AD is still lacking.

Quite simply, although smelting sites abound, none have yet been proved as 1st century, certainly not within easily accessible distance of the Bream, Noxon and Lydney ore sources.

Three Lydney sites are possible candidates, maybe four. Lydney town centre (G37) has been proposed as the site of a native settlement (Harris F. 1936 and 1937) and slags in association with pre/early Roman Native Ware pottery have been found. It has been impossible, so far, to collect any evidence from a site recorded as Cinderbury, now built over. Hurst Farm has produced good concentrations of smelted bloomery slag but they are well buried and there is no dating

evidence. The Park Farm (G36) villa excavation was never published by C.Scott-Garrett, even in interim form, so, although there is smelting and smithing slag lying around on the field surface it is presumed to be later than 1st century.

Further down-river from Lydney, on the cliffs north of Horse Pill (G102) a small exploratory excavation revealed slag fragments alongside 1st century Native-Ware pottery and early Severn Valley Wares but no structure has yet been identified. Allen and Fulford's investigations at the nearby Horse Pill (G101) proved '... a dense strew of primitive ironmaking slag and much iron ore' on the gravelly beach below the cliff but the few sherds of R-B pottery found were identified as 2nd to 4th century. With some certainty the slag had been redeposited (Allen and Fulford. 1987).

For the moment the mid-later first century ironworking evidence on the south side of the Forest is elusive and inconclusive. Reasonably, at that period of history the greatest demand for iron lay west of Dean, in Wales and progressively further north in Wales, however, the major military road from Newnham to Caerleon and Cardiff (Margary Route No. 60a and 60b), and the Severn estuary, were alternative routes along which iron bars, smithed artefacts and other supplies could be conveyed to coastal forts and depots, indeed, they were the logical routes to sites so situated. It is also conceivable that the Dean Road was utilised at this time for the transportation of iron and artefacts from Ariconium to the Severn for onward shipment. Wheeled vehicles would not have been necessary for the transportation of such compact items and pack-horses or mules would be better suited to the eight-feet-wide road. If this is indeed what happened then a south Forest smelting centre would not have been needed in the Claudio-Neronian period, and the forward centre at Monmouth would have taken over supply and distribution to the South Wales forts during the Flavian period, leaving Ariconium as the supplier to forts in central Wales and the Marches.

## 10.6 A CHANGE OF ADMINISTRATION IN THE FLAVIAN PERIOD ?

The mid-60s to the mid-70s AD represented a decade of change and disruption for the Roman military in Britain.

Nero's decision to assemble an army for his projected eastern campaigns resulted in the withdrawal from Britain of Legio XIV Gemina from Wroxeter, along with eight Batavian cohorts, thus leaving the north Welsh borders and the southern Pennines without a garrison. The Year of the Four Emperors in Rome, AD 69, saw more withdrawals with vexillations being taken from the remaining three legions as well as auxiliary regiments.

c.AD 67 witnessed the temporary abandonment of the fortress at Usk and the construction of a new fortress on the future Colonia site in Gloucester. The movement of the remaining two legions in the west, the second and the twentieth, is still open to speculation. Mark Hassall proposed that the XXth was moved from Usk to construct the new fortress in Gloucester in 67 and was later moved to Wroxeter in 75 (Hassall M.1987). W.H.Manning suggests that the XXth may have been moved from Usk to fill the vacant fort at Wroxeter c.67 with the IIInd Augusta being moved from Exeter to Gloucester to construct the new fortress (Manning WH, 1988). Neither of these proposals exhausts the possibilities. Whatever future archaeological excavations may disclose one fact is clear - during this period there were more legionary fortresses in Britain than there were legions.

Following on from the success of the Flavian cause in Rome and the installation of Vespasian as emperor in 69 there were urgent matters of state that needed to be resolved with some expediency, and these required finance. The disruption of the civil war had emptied the Treasury and the Privy Purse. Vespasian declared that '400,000,000 gold pieces were needed to put the country on its feet again'. He levied new and heavier duties and increased the tribute due from the provinces (Suetonius: Vespasian 16). There is no doubt that Vespasian's concerns were about the Empire and not just the country.

It is generally accepted that, once a country came under Roman control and became a Roman province, mineral rights came into state ownership. What Vespasian did was to create a powerful bureaucracy to ensure that maximum gains to the Treasury derived from ownership of these rights. To this end he confirmed the policy of Imperial estates, which included important metal-producing regions, and greatly extended the network. (Rostovtzeff M. 1957 and Cleere H & Crossley D. 1985).

Turning to military matters and especially to Britain, many of whose problems he had experienced as commander of the second legion some twenty five years earlier, Vespasian determined an attempt to annexe the whole island. He appointed three governors who would seek to accomplish this aim: Cerialis, Frontinus and Agricola, then proceeded to increase the strength of the British garrison by sending across the Legio II Adiutrix, defeated regiments from the Rhine and other auxiliaries. He even raised thirty new units from Gallia Belgica and Lower Germany thus raising the British garrison back to four legions with some fourteen alae and at least fifty six cohorts.

In AD 75, by the end of the decade of disruption, a new fortress was constructed for the Legio II Augusta at Caerleon and the campaign to completely subjugate the Silures and all of Wales was renewed and successfully brought to a conclusion.

It is against this background that we must now view events which affected Dean, its peoples and its industry during the last quarter of the first century AD.

#### **10.7 AN EARLY FLAVIAN BUILDING OF HIGH STATUS AT BLAKENEY**

As recently as December 1990 a discovery was made that could prove to be central to the understanding of the first century administration of Dean's resources.

A rescue excavation was undertaken by Dean Archaeological Group, under

the direction of Mark Walters, within the ground-floor rooms of a house that was due to be demolished and developed in Blakeney (G4). In 1987, the flag-stone flooring had been removed from one of the lower rooms in order to cut a trench for a water pipe-line extension. Fortunately, an observer recognised some 70cm of unbroken occupation layers below the flag-stones which contained Roman pottery. The pottery included some samian but was mostly coarse wares of the later first and early second centuries AD.

No archaeological work was undertaken for the next three years until development was proposed that would clearly disturb such close-to-surface layers.

Excavation began in the neighbouring room where the floors had been undisturbed. The remains of a building foundation wall 70cm wide were immediately revealed consisting of sandstone facing blocks and a pitched sandstone rubble core which included fragments of tegulae and hypocaust pilae from an earlier phase building which had been demolished. From the pottery evidence the later building construction must have begun before the middle of the 2nd century and was occupied for only a short time. No pottery dated beyond the Antonine period.

Excavation of earlier phases produced evidence for a high status building erected in the early Flavian period complete with ceramic roof tiles and a central heating system. Remarkably, the building was demolished in the late Hadrianic/early Antonine period at a time when other villas were being constructed in Dean.

The pottery evidence included a finely-preserved samian Form 30 drinking vessel of early Flavian date and many sherds of South Gaulish samian, probably all deriving from La Graufesenque.

Both South and Central Gaulish Form 37 bowls were present and a local grey-ware copy of a 37 bowl with the moulded decoration replaced by a zone of rouletting. The only coin evidence was a silver-plated denarius of Domitian struck in AD 89 which had hardly been circulated.

At the end of his interim report Mark Walters observed: 'The presence of a substantial building of Flavian date at Blakeney has important implications for the administration of the Forest region in the early years of settled occupation. To find comparable evidence of such building activity at this date elsewhere in Gloucestershire one has to look to military constructions..... The most likely context for the building here is an early administration centre for a high-ranking official, possibly appointed to supervise mining and other economically viable industries in the Forest area. Its termination by the middle of the 2nd century may indicate that economic interests had been handed over to civilian administrative bodies, or the official residence had been re-located' (Walters M. 1990).

Continuing excavations up to the summer of 1992 have produced no evidence that would require revision of the excavator's initial assessment. Rather they have confirmed both the status of the building and the early Flavian foundation date (Walters M. 1992).

The building is located at SO 673 069, 1.5 Km from the river Severn to which it is connected by the lighter-navigable Bideford Brook. The mouth of the brook is at Brims Pill, a substantial inlet, and the estuary here varies between 1 Km and 2 Km in width, then narrows to river width just north of the inlet. At least two, now disused, Roman roads connect the building to different points on the Severn. The building also stood alongside the main Roman military road from Gloucester to Caerleon and beyond (Margary route number 60a). By road, and a tidal river crossing at Newnham, it is 19 miles from the Gloucester fortress and later Colonia site. By river the Pill inlet is about 25 miles downstream of Gloucester. Blakeney is also connected to the Dean Road near Blackpool Bridge by another paved road thus providing an alternative route to Gloucester which avoided the tidal and unbridged crossing at Newnham. The building is also conveniently located near the south east corner of the ore outcrops which are exposed from Soudley to Wigpool immediately west of the Dean Road.



Before expressing his opinion on the probable reason for the building's construction the excavator had considered the possibility that it may have served as a post house for the *Cursus Publicus*, the Imperial communications' service. The service was founded in the early years of the first century by Augustus and consisted of a system of post houses and inns (*mansiones*) along major roads throughout the Empire at frequent intervals for the change of horses, and refreshment. Mounted couriers travelled either alone, in quick-moving two-wheeled carts or with passengers on a four-wheeled kind of stagecoach.

Because of its geographic position it is less likely that the Blakeney building served as a *mansio*. As aforementioned, travellers along the Gloucester to Caerleon road that passes the site would have been obliged to negotiate a tidal river crossing of the Severn at Newnham. The alternative and more obvious route to Caerleon would have been along the roads numbered 61 and 64 by Margary, via Mitcheldean. This route also had to cross the Severn but it would have been at the most used, better organised and better maintained crossing at Gloucester. Both roads converge at Lydney, which is 22 miles from Gloucester, and whichever route were chosen the distance was identical, however, anyone travelling via Mitcheldean would have added nearly three miles to their journey to Lydney or Caerleon should they have wished to avail themselves of *mansio* facilities at Blakeney. A post house near Lydney would have been much more logical and practical. Several roads converged there and it had harbour facilities.

It is around the time of the construction of the Blakeney building that the legionary fortress at Gloucester was probably abandoned and the one at Caerleon was constructed for the II<sup>nd</sup> legion.

Contemporary evidence for the emplacement of an official over mining activities comes from a little publicised site only 32 miles (52 Km) west of Blakeney and just 20 miles (32 Km) from the Wye at Chepstow. The site, at Lower Machen in Monmouthshire produced plentiful evidence for a high status building close to a lead mine at Cefn Pwll-Du, near

Draethen, which is 12 Km west of Caerleon. Among the significant finds were portions of Doric column-capitals of Bath-stone type. Floor tiles, roof tiles and flue tiles were much in evidence. Early samian pottery of South Gaulish origin dating from the Claudio-Neronian period, but with Flavian forms dominant, were abundant. The pottery sequence continued well into the 2nd century. A nearby working floor produced a charcoal layer and numerous pieces of lead and lead ore.

The lead mines revealed evidence of Roman lead mining in the form of mid-later 1st century pottery and coins of Nero and Domitian. In the 1960s the Bristol Mining Club located a 120m long gallery mine and were prevented going further by a rock-fall.

V.E.Nash-Williams observed: '...The site was certainly in Roman hands by the time of the completion of the Roman military conquest of South Wales (soon after) AD 75, and possibly before.... we may infer a small mining settlement under government control...the column capitals represented among the Machen finds imply a residential building of more elaborate type, doubtless the residence of the supervising officer. The chronological data suggests that the settlement was founded not later than AD 75, and continued in intensive occupation till the latter years of the second century' (Nash-Williams VE. June 1939 and Jones B. & Mattingly D. 1990). The 'supervising officer' may have been a civilian administrator but the proximity of the residence to the Caerleon fortress means that a military association must remain a consideration.

Thus a second early Flavian high status building is known in this region with a resident official, further evidence for the application of Vespasianic policies in connection with mineral wealth in, and west of Dean.

Significant changes could be expected and should be determinable in the archaeological record.

### 10.8. LATER FIRST CENTURY DEVELOPMENTS

The first noticeable changes occurred with the opening up of small smelting sites to the west of the Wye in south Herefordshire and Gwent. At both Gwenherriion Farm (G91) and at Lower Monkton (G34) smelting is associated with Flavian period pottery. South of Monmouth the three closely located sites of Trellech, Hygga and Great Crumbland (G77-85) produced great quantities of bloomery slag associated with Flavian pottery.

The key to this sudden industrial activity west of the Wye probably lay with Monmouth which, by now, had become a site of some importance. Ariconium apart, the only other centre suspected as being in operation at this time was Coleford which was essentially a workers' settlement with a religious focal point.

The second change of note was the cessation of smelting activities on the small village sites east of the Wye around this time. They also ceased to exist as villages and were never again occupied during the Roman period.

The implications are that the village communities of central Dean, between the Severn and the Wye, appear to have been re-located into larger known centres, either close to the mines at Coleford or to the iron-working centres at Ariconium and Monmouth. On present evidence the forestry workers, charcoal burners and coal miners must have occupied these settlements as well.

### 10.9 SOME PROBABLE REASONS FOR ADMINISTRATIVE CHANGE

Vespasian's aspirations and initiatives appear to have resulted in significant developments to Dean's iron industry both in organisation and output. A doubling of the processing centres would reasonably imply a doubling of activity in the related industries; mining and charcoal production.

Two reasons have so far been proposed for the need for change:

1. Vespasian's determination for tighter control of mineral resources and wealth-producing industries.
2. His plans for military expansion and annexation which began c.74/75 with a new fortress at Caerleon and the subsequent total subjugation of the Welsh tribes.

Although it is a reasonable assumption that Dean was the supplier of iron artefacts for the Welsh campaigns of the 70s it would seem that, once conquered, the Welsh tribes were not slow to accept the benefits that could come from co-operation and trading with the Romans. Recent research in Wales has done much to elucidate the nature and role of military vici, the settlements that grew outside the permanent garrisons in the later first century (Davies J.L. 1990).

Peter Crew observed regarding the evidence for early iron smelting on behalf of the Roman military: 'Perhaps during the early decades of the conquest phase the iron necessary for the fort building programme was brought in from some distance.' He acknowledged that further research could yet reveal local production centres of the first century. There was no shortage of iron ore of the bog-iron type in Wales and in later decades 'it seems unlikely that the iron would have been transported from Dean, or even further afield' (Crew P. 1990 in Burnham BC & Davies J. (Ed)).

In the last year of the reign of Vespasian AD 78/79, Agricola, having brought the northern parts of Wales into Roman control, turned his attentions north. By 79 the occupied territories stretched from the Tyne to the Solway on the west and by 80 from the Forth to the Clyde.

As Tacitus observed: 'Clyde and Forth, carried inland to a great depth on the tides of opposite seas, are separated only by a narrow neck of land. This neck was now secured by garrisons, and the whole sweep of country to the south was safe in our hands. The enemy had been pushed into what was virtually another island.'

In the fifth year of campaigning Agricola began with a sea passage, and in a series of successful actions subdued nations hitherto unknown. The whole side of Britain that faces Ireland was lined with his forces (Tacitus. Agricola. 23-24).

Tacitus' Agricola 25 continues to extol the part played by the Roman fleet 'The Britons, for their part, as was learned from prisoners, were stupefied by the appearance of the fleet. The mystery of the sea was divulged, their last refuge in defeat cut off.'

Of the fleet, Frere stated that it was: '...from time to time used in offensive warfare, such as the Claudian invasion itself, Vespasian's campaign in the south west, that of Frontinus in Wales, and those of Agricola in the north; but its main and enduring functions were those of transport and supply...' (Frere. 1967).

Once the Forth - Clyde line was secured the action moved to the eastern side of the Grampians. Inchtuthil fortress became the short-lived base and the Caledonians were defeated at Mons Graupius c.AD 84.

Ian Richmond was the first to propose that the iron from which the Inchtuthil nails were made was in all probability produced in the Weald and transported north by the fleet. Henry Cleere found circumstantial evidence for this in his researches into the iron industry of the Weald (Richmond I. Pers. Comm. with H.Cleere; Cleere H. 1975 and Cleere H. 1985).

That a section of the fleet was operating along the length of the east coast of Britain at this time is unquestionable. Initially it would have been supplying the IXth Legion as it made progress up the eastern side of the lowlands from Corbridge to Inveresk. The XXth on the western side of Britain, would need to be supplied from that coast as it made its way from Carlisle to eventually join up with the IXth on the Forth-Clyde line. As Prof. Salway observed about the 'crossing' by ship and the campaigns along the coast facing Ireland: 'It seems that these operations were in south-west Scotland..... The discovery of a

fort at Annan on the south-facing coast strongly suggests that the 'crossing' was a sea-borne assault across the Solway Firth from the Cumbrian coast....' (Salway P. 1984,145).

It would seem highly likely that this western section of the fleet, already deployed by Frontinus for his final conquest of the Silures off the South Wales coast, would be transporting iron for fabrica smiths and probably pre-fabricated iron artefacts from the Ariconium and Monmouth centres. If this proposal is correct then Flavian forts along the coasts of Cumbria and the western Scottish lowlands, indeed probably from the Severn to the Clyde, should contain iron artefacts whose source of iron was the Forest of Dean.

The foregoing offers a very strong THIRD reason for the doubling of output and processing centres around Dean in the early 70s, and the appointment of a co-ordinating administrator.

Further demands on the Dean iron industry, although to a lesser extent, may have followed the termination of the Agricola campaign by Domitian.

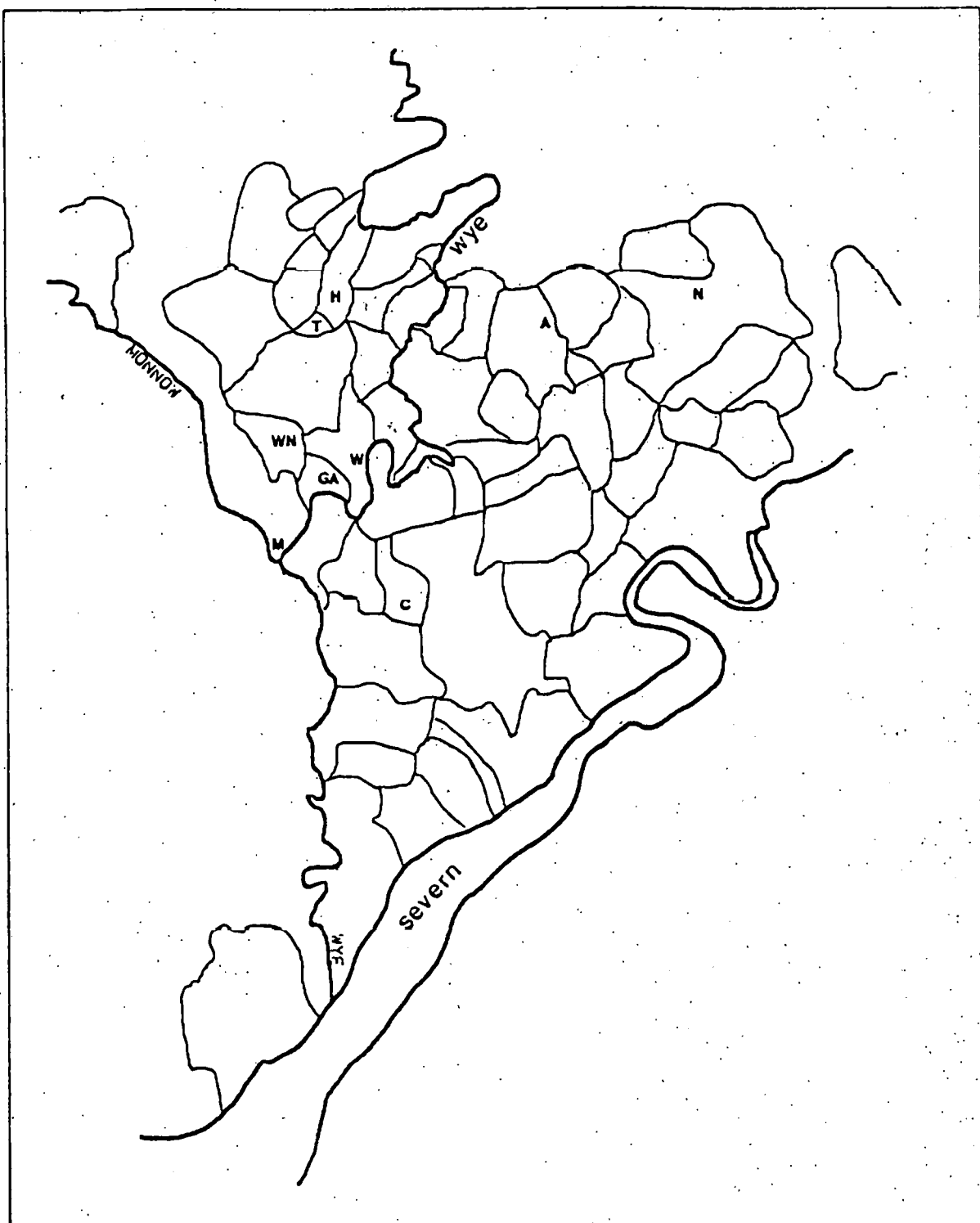
A recent re-assessment of the Gloucester evidence suggests that the XXth Legion, or at least part of it, returned to the city centre fortress site in the late 80s to effect a re-build of barracks and centurions' houses with external walls of mortared masonry and internal walls based on timber sills, or masonry footings carrying timber sills. The first period rampart was faced with a drystone wall. The north and east first-period timber gates were replaced with stone gates. These changes had previously been related by excavators to the construction of the Colonia but are now perceived as military. Not until the end of the century did Gloucester become a Colonia for retired soldiers; its military origins apparent for many years (Hurst H. in Webster G (Ed) 1988).

## 11. DEAN IRON INDUSTRY IN THE SECOND CENTURY AD

The last two decades of the first century and the first two of the second saw the beginnings of urbanisation in Gloucestershire. In the later first century Cirencester (Corinium Dobunorum) was laid out as the city (civitas capital) of the Doburni on the site of an earlier fort. Army engineers were probably assisted with labour by the local community. There is, as yet, no confirmation that Forest of Dean iron was used in the construction of the capital at Cirencester, although there must be a strong presumption that it was in view of the direct road links. There is no reason to doubt that Dean iron was fully utilised for the second century development of the Gloucester Colonia site in the construction of public buildings and homes for the veteran incomers. The same must apply for the new capital of the Silures at Venta Silurum (Caerwent) which is only 10 Km from Dean (McWhirr A. in Webster G. (Ed) 1988).

For the previous fifty years the Dean industry had been dominated by military requirements, although not exclusively. The growth of urban centres brought diversification, at least as far as the smiths who forged the artefacts was concerned.

A glance through the British Museum's catalogue of Romano-British Iron Tools, Fittings and Weapons (Manning WH. 1985) indicates the staggering range of implements in production; over one hundred and forty are listed. Reduced to categories they include tools for a diversity of trades from agriculture to metal-working, transport, toilet implements, surgical instruments, styli, locks and keys, domestic equipment, axes, knives and cleavers, and a wide variety of structural fittings. The first century requisitions would repetitively have listed: nails, hammers, picks and weapons. The second century smiths had to discover the intricacies of locks, the subtle shapes of strigils and the broader heads of T-clamps for masonry.



### SECOND CENTURY IRON-WORKING SITES

MAJOR CENTRES: A = Ariconium M = Monmouth C = Coleford N = Newent

W = Whitchurch GA = Doward WN = Welsh Newton H = Hentland

T = Tretire



## 11.1 SECOND CENTURY EXPANSION

As with the iron industry in the Weald the Dean industry experienced some very significant developments and visible expansion during the first quarter of the second century. Before suggesting reasons for this the major changes that took place will be considered.

## 11.2 ARICONIUM

In 10.2 it was proposed that the military controlled iron-working centred on SO 6415 2470 extended through the Claudio-Neronian period into the Flavian. In the late first/early second century the smelting and smithing area was re-located some 400m to the south east into what is now known as Hask Barn field (SO 6445 2440) and also a neighbouring field at SO 646 242. The latter field is under different ownership and has not been ploughed in living memory, however, use of a metal detector disclosed that it contains many acres of spread iron slags, a seemingly much larger area than is occupied by the known Hask Barn field site. It was the latter field that was excavated by N.P.Bridgewater, leaving the adjacent field uninvestigated and perhaps unknown until recently.

## EXCAVATIONS 1963

The excavations over an area of 84 feet by 72 feet (25.6m by 22m) revealed remains of six furnaces, probably shaft type, primary smithing hearths and a charcoal store. Coal samples were also retrieved. Bridgewater reported: 'It is fortunate that some dating evidence for the use of the furnaces was discovered, this ranging from before AD 125 until the end of the second century.' The excavator's next comments are worthy of note here and will be discussed more fully later:

'A reasonable picture thus emerges of smelting and smithing activities in the second century, leaving hollows partly filled but mostly open. During the following centuries the hollows and the surrounding slag heaps must have become rubbish dumps for the occupants of the houses at Ariconium, but later the land reverted to a scrubby waste' (Bridgewater NP. 1965).

There is, of course, no dating evidence whatsoever from the adjacent un-ploughed field. It ought to provide evidence for iron-working in the intervening years between the closure of the mid-late 1st century site and the Hask Barn field site excavated by Bridgewater.

Aerial photography by DAG in 1990 revealed a large, sub-rectangular ditched enclosure immediately to the west of the excavated site and separate from the smelting and smithing area (Film 24/23-25, 1990).

Another large iron-working site is all of 700m to the south of the excavated area towards the southernmost limit of the Ariconium settlement at Cinder Hill. It is unexcavated but most of the surface finds are consistently second century. It could, perhaps, be viewed as the successor to the Hask Barn site or may indicate a contemporary expansion. (Cinder Hill site centred on SO 6425 2370).

These three predominantly second century iron-working sites filled, between them, around thirty acres of spread slags and iron-working debris, and represent the most prolific production period at Ariconium.

### 11.3 BLESTIUM - MONMOUTH

Twelve miles away from Ariconium, to the west of the Wye, the second century expansion pattern was repeated at Blestium. Under 10.4 the dating evidence for the mid-later first century primary smithing hearth, which had been located to the side of a ditch-like cut, was discussed. That hearth was sealed in by, and the ditch filled with,

late first/second century pottery and smelting/smithing slags. The levelled area surrounding the ditch was a second century surface cut by a gulley which contained a timber structure. Here the pottery and small finds were almost exclusively of second century date with a few pieces, including Rhenish wares that probably took it just into the third century.

Mainly tapped bloomery slag lay everywhere on the second century surface usually accompanied by remnants of furnace lining and baked clay with tap-hole entrapped slags common. The pottery assemblage was consistently of 2nd century forms with a wide range of Dorset BB1 pots, bowls and casserole-type flanged bowls. Samian wares were all Central Gaulish, Trajanic to late Antonine, including a stamped bowl of BANVVS, late Antonine.

One notable discovery was a nail-scratched graffito on a sherd of Black Burnished cooking pot of mid-2nd century date. The roughly inscribed inscription read NOVE, with traces of letters before and after. Dr. Roger Tomlin found parallels for this as the Celtic name: (CU)NOVE(NDUS) (Tomlin R. 1989 and 1990).

A second century plate on bow brooch further confirmed the dating.

In the report on the excavation (Walters B. 1988) one section is headed: THE GREEN-FIELD EVIDENCE. It proposed that around the beginning of the 3rd century, iron-working ceased in that part of the town and the whole area became an un-ploughed green-field. A rich loam layer built up over the second century features which, where undisturbed by medieval development, still contained stratified 3rd and 4th century pottery overlain by pottery of the medieval period. The John Speed map of c.1610 still shows this area of the town as a green-field as does an 1835 Plan of Monmouth by John Wood.

Remarkably, just as at Ariconium, there was a cessation of iron-working activity in and around the main settlement and nature reclaimed possession of an abused top-soil. The one difference, as we

shall see, is that, whereas the decline at Ariconium was terminal to the industry, the industry of Monmouth transferred to the suburbs at Overmonnow, south of the town and the River Monnow, and continued during the 3rd and 4th centuries.

Further evidence for the expansion of the industry in Monmouth during the second century is listed in the Gazetteer where rescue and salvage excavations by the Monmouth Archaeological Society in preceding years had found 2nd century iron-working features, including furnaces, at Granville Street, Spencer's Yard, and the Town Wall by Dixon Gate, all within 300m of the Glendower Street School excavation of 1988.

#### 11.4 SOUTH HEREFORDSHIRE IRON-WORKING WEST OF THE WYE

This group of iron-working sites lies between four and seven kilometres north to north west of Monmouth where Herefordshire now borders Gwent, Wales.

The ore source for all of these sites was, with logical certainty, the Doward outcrops which are 4 Km north west of Monmouth and 1 Km from the most extensive smelting areas in Whitchurch parish.

That the iron-working products were directed towards Monmouth, rather than to Ariconium, is also logical. To have taken blooms or billets to Ariconium would have meant crossing the Wye and carting them 5 Km further east. The Wye must be considered an important element in transportation and distribution throughout the Roman occupation period in the southern borders and Monmouth is on the Wye.

The sites in question are located within four parishes, namely: Whitchurch (G97), Welsh Newton (C91), Tretire (86,87) and Hentland (G23,24). Known ironworking sites in the parishes of Peterstow, Llangarron, St.Weonards and Goodrich would be included in this grouping if the Roman pottery finds recorded on those sites could be dated to the second century.

Whitchurch village overlies a deep bed of slag with second century samian identified 8 feet deep in the slag deposits. An hardly circulated coin of Trajan was found while gathering slags in the 19th century when the cinders were noted as being up to 10 feet thick (Bridgewater NP. 1968 and Wyrral G.1877/78). Bridgewater was able to confirm the presence of second century samian and coarse wares in deep slag deposits from three excavations close to the village. No artefactual evidence later than second century has been reported.

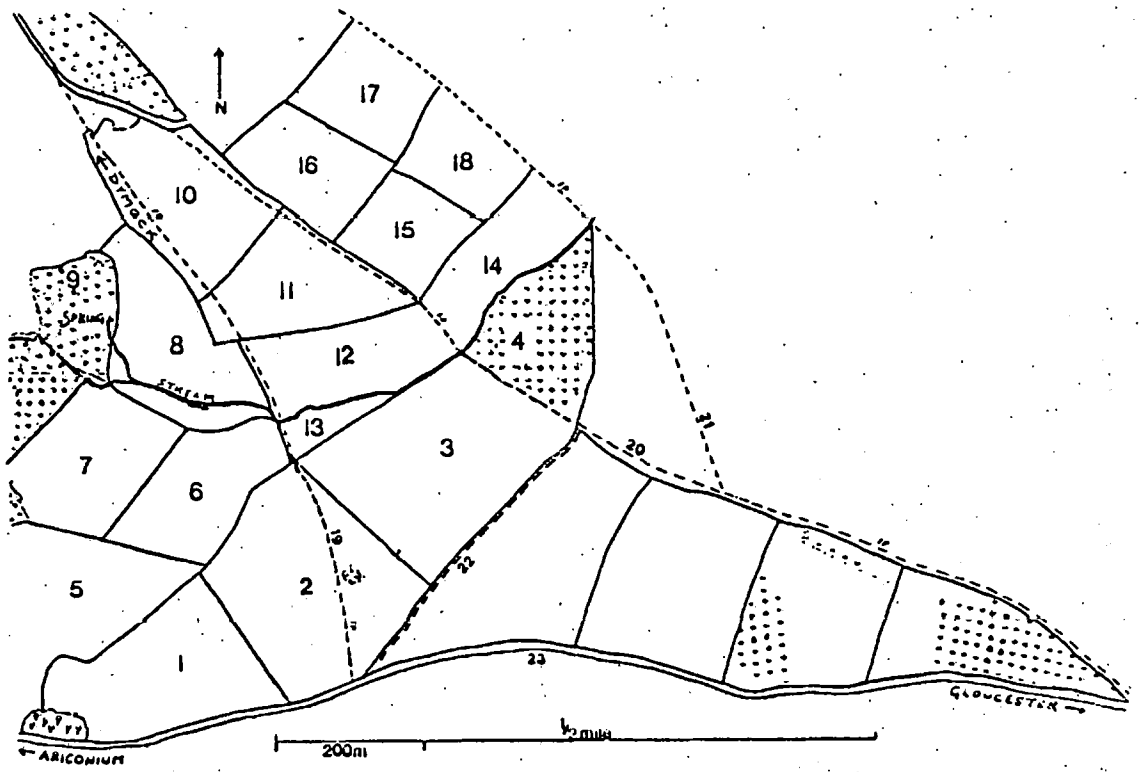
Welsh Newton was operating during the latter part of the first and during the second centuries. Central Gaulish samian and Black Burnished pottery confirm the later evidence. No artefacts later than second century are present.

Tre-Addow, a recently discovered site in Hentland parish, where it borders Tretire, was located from DAGs 1989 aerial survey. Structural and boundary ditch features are accompanied by nearby dense slag deposits from which R-B pottery was found. Although fragmentary the fabrics suggest a late first century site running through well into the second. More field work here should confirm the dating.

The Lords Wood settlement (G98) on the Wye-side slope of the Great Doward certainly contained plentiful 2nd century pottery as well as 1st. It lies just inside the Whitchurch parish.

Regrettably, during trial excavations on several of the south Herefordshire sites in the 1960s, no dating evidence was offered for the coarse wares found in slag deposits. This may well have been because most of the pottery finds were body sherds, at which time their fabrics were undatable, rather than recognisable rim-forms. Location of these pottery finds, if they still exist, could possibly clarify the date ranges.

An assessment must be made for this group of iron-working sites, although any date range offered must, for the present, be accepted as tentative. The earliest date that can be assigned is early second



PLAN OF THE SECOND CENTURY IRON-WORKING SETTLEMENT AT NEWENT

century and the latest around AD 200. Welsh Newton, of course, was in operation from the late Flavian period. Whether they all had this date range cannot be assessed due to lack of evidence. Presently there is no evidence to date any of them beyond the second century.

In summary, despite the problems, the group must be considered as a mainly second century expansion of iron-working activity possibly supplying smiths in Monmouth with the raw materials for forging. Whitchurch must be considered the focal point due to its proximity to the Wye and its location on the Roman road from Ross to Monmouth which runs through the village (Margary Route 612a).

#### **11.5 A MAJOR NEW IRON-WORKING SETTLEMENT AT NEWENT See G58.**

This essentially second century, self-contained metal-working and pottery producing settlement lay unrecorded until 1990.

It is just south of Newent town, surrounded by its own Roman road system and not far west of the Gloucester to Dymock and Stretton Grandison Roman road (Margary No.610). It is close to a farm called 'Caerwents', which is one of the reasons why DAG investigated the area by air and on the ground. It is worthy of note that the 'went' or 'Venta' element is present also in the name of Newent. The origin and meaning of Venta is still uncertain, in fact five and a half columns are devoted to the discussion in Rivet and Smiths' 'The Place Names of Roman Britain'. Dominant suggestions centre around 'market', 'place' and 'field'. A place devoted to trading would seem to be a reasonable definition and would certainly apply to the Newent settlement (see Rivet ALF and Smith C. 1979).

It is 7 Km distance from the nearest Forest ore outcrops on Wigpool and is 8 Km east of Ariconium. South east of the settlement is Gloucester at 12 Km distance. There are local ores in the sandstones and limestones which were mined in recent centuries, however there is no evidence that they were utilised during the Roman period, indeed,

the circumstances prevailing during the 2nd century AD would suggest that it was extremely unlikely that they were used. This will be discussed later.

The main iron industrial area is to be found in fields 6 and 7 ('Cinder Pits' on the 1838 Tithe map) in which are close on 14 acres of solid smelting and smithing debris with a very heavy concentration of pottery to the east end of the field suggesting an occupation/kitchen/workshop area. The whole of 6 and 7 were black with charcoal debris. Other slag areas are to be found in fields 2 and 3 next to massive filled-in clay extraction pits. It was here also that pottery wasters and kiln waste were found along with copper-alloy slags and lead waste including lead from a crucible. A damaged cast lead votive 'wheel' was from area 3, so were several lead weights.

Parts of fields 8, 11 and 12 were an occupation area with numerous roof tile fragments along with pottery and re-deposited slags used as hard-core. It may have either been a tile manufacturing area or the tiles may have come from buildings, however an excellent clay is little more than 20-30 cm below the present top-soil level.

An isolated building of some status stood in field 4, separated from the working areas by a Roman road numbered 20. The settlement is bounded on the south side by a Roman road, 23, which is here raised on an agger. The total acreage of the fields containing evidence of either occupation or industry is 117 acres.

The pottery made on site is rather distinctive. The forms are the same as for Severn Valley Wares, so is the colour. The fabric tends to be fine sand tempered with distinctive clay 'pellet' or grog inclusions which frequently show through the pot surfaces. When broken they have a moderately hackly (jagged) appearance. By description they do not appear in the Gloucester Type Fabric series and are very rare at Ariconium. They have not been found on any other site in Dean.

The inference is that they were made and used at the settlement and



were not intended primarily for trading. Second century forms dominate the assemblage. The only BB1 found was a neck sherd and a fragment of a flat-rimmed bowl, also 2nd century. Samian was scarce and mostly Central Gaulish, however two South Gaulish bases were found, from a Form 37 bowl and a Form 33 drinking vessel. The only other datable object was an early to mid-2nd century brooch.

It is possible that both copper-alloy and lead objects were traded but, unquestionably, the major product was iron. The vast amount of tapped bloomery slag and smithing hearth bases suggests that iron was processed from smelting the ore to the manufacture of artefacts. The site appears, from a multitude of surface finds, to have been in operation throughout the second century and possibly just into the third. The Newent iron-working site rivals in size the Ariconium second century ironworking areas.

It would seem that Newent had its own smiths and that it was self-sufficient. It was apparently created for a major, new market that opened up in the second century and for around a hundred years, while that market was still open to its products, it prospered. It then became a deserted Roman village.

#### 11.6 DWELLINGS OF HIGHER STATUS AND THEIR LOCATION

Discussion of second century expansion in Dean would not be complete without a mention of several higher status buildings which had their modest beginnings in the Hadrianic/Antonine periods, even though there is no conclusive evidence that the working of iron took place on site during that century.

Excluding the Blakeney building mentioned earlier and which was demolished around the mid-2nd century, three new residential dwellings are known to have made an appearance along the Severn estuary. Moving downstream from Blakeney the first is located at PARK FARM, LYDNEY (G36), and lies between the Lydney hill-fort and later Roman temple

site, and the Severn. The villa was part excavated by Dr.C.Scott-Garrett in the late 1950s and early 1960s but was never published. M.Fitchett published a site plan from drawings and notes deposited in the Gloucester Records Office. Three buildings were located, the main one, a corridor type building measured 75 feet by 43 feet. A collection of the samian pottery is in Gloucester Museum and is mainly Hadrianic/Antonine, although three bowls could have spanned the Trajan/Hadrian period. Scott-Garrett, in his notes, continually referred to one of the surrounding walls as being the 'wharf wall' and connected with river traffic. However, the Severn is presently more than a kilometre away and a recent sewer pipe-line excavation, which bisected the ground between the villa and the Severn, failed to reveal any kind of a silted-up cut or channel going in the direction of the villa (Fitchett M. 1986 and DAG field-work, 1989).

CHESTERS VILLA, WOOLASTON (G99/100), about half-way between Lydney and Chepstow and overlooking the Severn estuary, was part excavated by C.Scott-Garrett and F.H.Harris in the 1930s. It was described as a developed corridor-type villa with a baths system. It was re-developed in the 4th century.

Aerial survey by DAG in 1989 revealed a much larger, later phase building standing at right angles to the excavated one. Dating evidence suggests an Hadrianic first phase, possibly early Antonine (Scott-Garrett C & Harris FH. 1938 and DAG Aerial Survey: 12/17-20, 18.7.89).

BOUGHSPRING VILLA (G74) is 3 Km east of the Chesters villa and occupies higher ground with extensive views over the Severn estuary to the Cotswolds. It was excavated intermittently under T.E.Wilcox between 1976 and 1985. Brief interim reports were published. In 1990 Joyce Pullinger, with the excavator's co-operation, produced and published the fullest possible excavation report.

The first phase building was probably early Antonine and a simple rectangular structure which was extended in the later 2nd century. A

corridor was added later, and, in the 4th century, wings. The later 4th century saw major developments when the earlier villa was converted to a bath house and a multi-storey building was erected on a platform in front of it. As at Woolaston, the villa had been abandoned and left to decay. Roof tiles had fallen in. Wall plaster had detached and some flag-stones had been robbed. Some time after abandonment a woman, aged about forty, had been buried in a grave cut through the NE corridor room (Pullinger J. 1990).

STOCK FARM VILLA, CLEARWELL (G61), is 12 Km north of Boughspring and is unique in Dean being the only residence associated with iron mines, in fact it is in the centre of the iron mining area on the west side of the Forest and immediately adjacent to the Perrygrove/Great Lambsquay scowles and near to the Clearwell iron mines.

The villa was identified in 1985 from a 1976 aerial photograph. A small exploratory excavation confirmed it as Roman. A subsequent excavation by H. Atkinson, away from the building, revealed 2nd to 4th century pottery. Parch marks suggest a corridor-type villa of approximately 22m x 12m. The positioning could not have been better: 150m west of the scowles and on elevated ground with views that extend as far as the Brecon Beacons. The villa is 2 Km south of the Coleford iron-working settlement (Walters B. 1985 and 1990 and Atkinson H. 1986).

A little more than 8 Km north of Stock Farm on the northern edge of the Forest, in a loop of the Wye below Symonds Yat hill-fort, is the HUNTSHAM VILLA (G22). It is 20 Km away from the Woolaston and Boughspring villas and lies just within Goodrich parish which is now in Herefordshire.

Excavations took place there from 1960 under the direction of N.P. Bridgewater at SO 565 176. They revealed a winged-corridor villa with one wing extending for around 100 feet. A corn drier was located in a nearby aisled barn. The excavator placed the first phase in the 2nd century and the latest phase towards the end of the 4th century. The DAG aerial survey in 1989 located a series of ditched enclosures to the north of the villa. Bridgewater was aware of one of these. Interim reports were published but no final excavation report. Elizabeth Taylor, of the WNFC Archaeological Section, is now working on this with a view to publication. The pottery from an excavation on the largest enclosure was all of first century AD black Native-Ware forms and closely paralleled those from Symonds Yat hill-fort and the Ariconium native settlement. This must raise the possibility that the Huntsham villa developed on the site of late Iron Age agricultural

land-holdings (Bridgewater NP. 1962 and 1965; DAG AERIAL SURVEY: 1/26-28, 18.6.89 and 7/15-18, 2.7.89 and 10/4-10, 2.7.89.).

THE HADNOCK VILLA (G56) is on the western edge of the Forest, overlooking the Wye and immediately below the Little Doward hill-fort but on the opposite side of the Wye. It has its own road link to the cross-Forest Roman road from Mitcheldean to Monmouth and is 2 Km upstream from Monmouth.

The villa, at SO 535 151, was discovered by Monmouth Archaeological Society fieldwalkers in 1981. The Romano-British pottery suggested a date range from 2nd to 4th centuries, however, recent communication with S. Clarke of MAS disclosed a collection of black native-ware pottery, including Malvernian hammer-rims, which could again suggest a pre-Roman, or early Roman origin for the site. There are very heavy deposits of iron slag all around the villa and along the river bank but, beyond being of the Roman-period, they have not been more precisely dated (Clarke S. 1981).

That completes the list of known villas, all, excepting the Stock Farm villa, being located on the perimeter of the Forest and overlooking either the Severn or the Wye.

Mention must be made of two other possibilities about which little is yet known. The first is the occupation site at LOWER LYDBROOK (G18) which is close to the Hangerbury ore outcrops and is also overlooking the Wye. It was an enclosed site and had a later building with stone foundations. The pottery range from a small exploratory excavation is possibly as early as 1st century and certainly as late as 4th century. It lies 3.5 Km east of the Huntsham villa.

The second potential villa site is at POPES HILL, LITTLEDEAN (G29) on the eastern perimeter of the Forest. The site is less than 2 Km from the Severn and has wide-ranging views over it to the Cotswolds. It is 1 Km south of the hill-fort on Welshbury Hill and contains buildings associated with iron-working of the Roman period.

Chesters, Woolaston, is the ONLY villa that began as a high status residence with a baths in the mid-2nd century. If we now recall Mark Walters' observations on the Blakeney high status building: 'Its termination by the middle of the 2nd century may indicate that economic interests had been handed over to civilian administrative bodies, or the official residence had been re-located.' To this could be added: or BOTH. If an official's residence had been re-located then the Chesters Villa at Woolaston is the only possible location if status was to be preserved.

The Stock Farm villa appears to have been constructed when mining expansion began early in the 2nd century and is close to the mining settlement at Coleford. From its plan it seems to have been a modest but comfortable residence situated in the best possible position considering its proximity to the ore outcrops and mining activity. It is tempting to view it as the residence of a succession of occupants concerned with the administration of the ore-mining industry but further excavation is necessary before this can be convincingly proposed.

It would be reasonable to propose that the appearance of modest residences peripheral to the ore outcrops reflected the second century expansion of the iron industry and a development in the organisation thereof. This too is apparent in the construction of higher status buildings at Ariconium including the 2nd century building partly excavated by G.H.Jack in 1922.

At COLEFORD (High Nash) (G13) rescue excavations on a sacred site also reflected this upsurge in activity. Whereas first century pottery was sparse, the second century is well represented by flat-rimmed bowls, both Black Burnished and in Severn Valley Ware, some Central Gaulish samian and a distinctive, locally-produced vesicular pottery, organically tempered and with a 'waxy' feel and emerging from the pre-Roman Native-Ware tradition. Re-deposited slags, in association with this pottery, were dense.

### 11.7 SUMMARY OF PROBABLE REASONS FOR THE SECOND CENTURY EXPANSION

In his discussion of Viroconium, (Wroxeter), The New City of Hadrian, Graham Webster underlined some important Hadrianic innovations:

1. 'Hadrian's plan was to bring urban civilization right up to the frontiers, and with it a determined drive towards the spread of trade, industry and efficient land use.'
2. 'Hadrian's main achievement was the effective improvement to Imperial administration and government, which he regarded as a personal task, however minute and tedious the detail.'
3. 'He made all rivers free for traffic with access to the bank for moorings (The Digest of Justinian), (Webster G. 1988)

Webster also observed: 'Legionary fortresses were invariably situated on navigable rivers with access to the seas, and this required extended military areas for harbour and wharfage, with warehouses (ibid.133).

Peter Salway illuminates the developments thus: 'Both in town and country the adoption of Roman ways and tastes and the increasing complexity of local and central administration meant a growth in service industries and occupations. This brought in more and more Romans in official posts at every level on varying lengths of tour of duty, and Romanised people from many corners of the empire in the way of trade and business. It also opened up opportunities for local men in larger numbers and further and further down the social scale. In particular the countryside must have been affected directly by many industries depending on natural resources - for example iron deposits or potters' clay - for in many ways industry was a rural rather than urban phenomenon in the ancient world. Indirectly the development of a money economy and the multiplication of opportunities for marketing must have had a profound effect on rural economies and the involvement of the rural population in the Roman way of life (Salway P. 1984,188).

Although in a later chapter on TRANSPORTATION AND COMMUNICATION the evidence will be more fully dealt with, it is pertinent here to draw attention to the remarkable access to rivers, sea and new road systems that was afforded to Dean and its iron industry. It is virtually surrounded by navigable rivers and had new Roman road links to South Wales, northwards along the Welsh borders and eastwards to Gloucester with short links to the Fosse Way. Downstream to the Bristol Channel there were the navigable rivers Avon, which gave access to Bath and the Wiltshire heart-lands, and the Parrett which provided access to Ilchester and the Somerset developments. Both of these areas are well within the region proposed by Henry Cleere as potential markets for the Dean iron trade (Cleere HF.1981,206) and well away from the Wealden and Jurassic Ridge production areas.

Upstream, the Severn would have been navigable as far as Wroxeter, although, as will be demonstrated later, not without its problems. This would have provided access to the developing towns of Worcester and Wroxeter. At the latter the timber-constructed early settlement was levelled and, early in Hadrian's reign, a new city constructed in stone began to emerge (Webster G.1988).

The Wye provided limited navigable access to Kenchester (Magnis) which lies some 30 Km north of Monmouth and around 20 Km north west of Ariconium. The enclosed area of the 'town' covers only nine hectares but it did form part of the ITER XII between Leintwardine (Bravonio) and Abergavenny (Gobannio). Its first defences were dated 'not earlier than the middle of the second century' (Heys FG & Thomas MJ, 1963).

Local second century developments at Gloucester, Cirencester and Caerwent have already been referred to. Published proof that Dean iron was used in the construction of these important and extensive centres is lacking but its use is inferred and is beyond reasonable doubt.

With regard to demands for Dean iron in connection with Hadrian's Wall enterprise and its related forts and milecastles there must be



1. The Wall began to be constructed from the eastern side.
2. It is known from an inscription that vexillations of the fleet were working on the Wall (Collingwood RG & Wright RP. 1944/45).
3. Henry Cleere postulated that the entire Weald was an Imperial estate, the eastern part being under direct procuratorial control with involvement, in some way, by the Classis Britannica, while the western part was probably leased to conductores and/or coloni (Cleere H. 1975 and Brødribb G & Cleere H. 1988).

These three factors combine powerfully to indicate that the Weald was the primary source for iron requirements connected with military installations along Hadrian's Wall. Equally, these same factors indicate that pressures were now increased on the iron industries, of especially the western Weald and the Forest of Dean and perhaps to a lesser extent the industries along the Jurassic Ridge, to satisfy the rapidly expanding civilian market.

The same arguments would hold good during the ensuing Antonine period and for the Severan campaigns into Caledonia.

As with the first century Agricola campaigns into Caledonia, the early third century ones would have depended on supplies by the fleet along the east coast. Once again a considerable supply of iron artefacts would have been required and the Weald remains the obvious source of primary supply leaving the Dean iron industry to cope with the many civilian re-constructions that took place around the turn of the third century.

## 12. THIRD CENTURY DECLINE IN THE DEAN IRON INDUSTRY

### 12.1 CLOSURE OF MAJOR IRON-WORKING SITES

At the beginning of the third century, probably within a few years of AD 210, three of the main iron-processing areas in and around Dean were closed down. These included both the oldest and newest Roman-period settlements.

The closures appear to have terminated all major production on the South Herefordshire sites including Ariconium where the ironworking 'hollows and the surrounding slag heaps must have become rubbish dumps for the occupants of the houses at Ariconium, but later the land reverted to a scrubby waste' (Bridgewater NP. 1965). The other satellite site to the north of the Forest, Newent, even ceased to exist as a settlement.

The contracted industry was now concentrated on the main Forest area, close to the mines, at Coleford, while at Monmouth there were changes that were not too detrimental to the local iron-working community and positively beneficial to the town centre dwellers. Industry moved out to the suburbs south of the town, onto the other side of the Monnow and alongside the road to Usk, at Overmonnow.

### 12.2 REVIEW OF SECOND CENTURY PRODUCTION

In order to ascertain the probable reasons for the closures it is necessary to make some kind of an estimate as to how much iron-ore had been mined and processed during the second century expansion.

Unlike the Weald, where substantial slag heaps still remained until recent years and some kind of estimate could be made of their volume, above-ground slag heaps from the Dean and Wye valley Roman industries had been removed for re-working in the blast furnaces during the 17th

to 19th centuries. As Andrew Yarranton put it in 1677: 'In the Forest of Dean and thereabouts as high as Worcester, are great and infinite quantities of cinders..... which will supply the ironworks some hundreds of years; and these cinders make the prime and best iron, and with much less charcoal than doth the ironstone.' Yarranton's estimate proved to be optimistic by far. The cinder/slag heaps were not infinite and had been removed as heaps from above ground some two centuries later to satisfy the voracious blast furnaces and the Industrial Revolution's demand for iron.

In recent years researchers from the Gloucestershire Society for Industrial Archaeology have been estimating the amount of ore extracted from outcrop and underground iron workings in order to see if this approximates to the amounts postulated by documentary evidence. Paul Wildgoose has already proposed an amount from the outcrop workings at Wigpool. His Ph.D study concentrated 'on the mine workings likely to have been used to extract ore for bloomery smelting prior to AD 400.' His conclusion was that: 'The evidence for surface mining at Wigpool is clearly visible, and the total volume extracted is estimated to be at least 289,702 cubic metres, which equates to approximately 600,000 tonnes of ore if a yield of 50% is assumed, and a density of 4 tonnes per cubic metre' (Wildgoose P. 1988).

David Bick on the other hand has sought to extrapolate, from the known number of blast furnaces, their operating spans and the accounts of certain typical furnaces, the total bloomery cinders used in them and has then to add on an estimate of the quantity of bloomery slags still lying underground (Bick D. 1990). Bloomery slag, of course, was produced from the late Iron Age to around 1600.

The results of his research indicated that a MINIMUM of 2,060,000 tons (2,092,960 tonnes) of ore was smelted in the bloomery era. In his qualifying remarks he added that: 'It is important to remember that the above figures are based only on the actual quantities of cinders re-smelted in the blast-furnace era. There is no doubt that the total tonnage of bloomery cinders was originally much in excess of the

estimated values, and for several reasons:

1. Some sites of cinders were never exhausted, and others may not have been used at all ....
2. Large volumes of cinders have from time immemorial been used for road-making and hardcore ....
3. Large tonnages were exported up-country and to Ireland for re-smelting in charcoal furnaces ....'

Bick concluded: 'In short, it is not unlikely that the true quantity of bloomery cinders and corresponding ore and iron, amounts to double the estimate.'

As this study is concerned with the amount of ore mined and smelted during the 1st to 4th centuries AD it is first necessary to estimate how much ore, when smelted and processed, would produce a tonne of slag (cinders). This determined it might then be possible to estimate, from the visible spreads of residual slag on some Roman ironworking sites, how much ore may have been smelted there.

As Bick observed: 'It has proved difficult to find published information as to the amount of cinders produced from smelting a given amount of ore in bloomeries. The figure would depend on many factors, but some representative value must be chosen in order to arrive at an estimate of the corresponding quantities of ore consumed ...'

After considering various ratios Bick decided that: 'Actual experiments using bloomeries have confirmed that a ton of ore produces about a ton of slag (cinders), though the amount is sometimes much less, depending on the ore (information from P.Crew). Taking the evidence as a whole the ore/cinder ratio will be assumed 1:1' (ibid.).

In other words, for the purposes of an approximate estimate, it is assumed that one tonne of slag was deposited on to a slag heap as a

result of one tonne of ore being mined, smelted and processed into usable iron.

The next step is to consider which confirmed Roman-period ironworking sites in this region have assessable areas of residual slags.

To be assessable the whole known area of ironworking must ideally be ploughed. A geophysical survey over pasture land or woodland can determine the spread of ferrous material but not necessarily the mass of concentration from which it has spread. A series of small excavations in an urban environment can only confirm the presence and quantity or absence of slags at the point of excavation. The more excavations that take place the more accurate the assessment is likely to be.

Of the major ironworking sites under review only Ariconium and Newent are annually revealed by the plough.

Many of the smaller sites are frequently ploughed.

Urban sites that can only be assessed by excavation are: Monmouth, Overmonnow, Coleford, Whitchurch, Blakeney and Lydney (so little is known about what lies beneath the town centre of the latter that it has been impossible to bring it under review). One could also add Dymock which is on the northern borders of West Gloucestershire and certainly has bloomery slag remains. No excavation there has adequately dated the slag deposits so it has not been taken into consideration in this study.

The current spread of slags on ploughed sites can be easily measured and the area calculated. In some instances it has been possible to determine the diameter of the concentration from which material has been spread over the years. What it is not possible to know is the original height of the slag heap before the cinders were removed for re-smelting. The depth of the residual slag can sometimes be determined.

In order to proceed further some acceptable formula must be devised in order to produce a reasonable estimate of how much slag may have originally lain on and around the site when ironworking ceased.

Fortunately Henry Cleere was able to offer some calculations on Wealden productivity which may be utilised as a guide, if nothing more, to what was produced in Dean.

This is not the place to reproduce the details of the statistical methods employed by Dr.Cleere in arriving at his estimates. The enquiring reader may consult Cleere H. 1976 or Salway P. 1984,637-639 who made use of them for his analysis of the iron industry of Britain.

The guiding statistic is derived from the Beauport Park site near Battle, Sussex which had a great slag and refuse bank covering more than two acres. Dr.Cleere's estimate was that it had contained upwards of 100,000 tonnes of iron slag which had accumulated over its working life which extended from the beginning of the 2nd century to around the middle of the 3rd century, about 140 years.

The two acre slag dump at Beauport Park may, or may not have stood at a greater height than many of this region's slag dumps. Here one should bear in mind the written observations of W.T.Watkin (1877) when referring to visible slag heaps in south Herefordshire: 'The beds of cinders are in some places from twelve to twenty feet thick.' J.W.Grover (1873) recorded: 'For many miles together the ground is formed of a continuous bed of cinders.' N.P.Bridgewater recorded samian pottery at depths of eight feet in the slag at Whitchurch during excavations as recent as the 1960s. Note, this was eight feet deep in slag that still remained BELOW ground. To the possible height of any dump above ground must be added what may still remain below ground.

Based on the estimate that two acres of slag concentration may originally have contained a heap of 100,000 tonnes of slag which in turn may have derived from the smelting and processing of 100,000

tonnes of crude ore the following statistics emerge for known areas of second century ironworking:

#### ARICONIUM:

Area of present spread of 2nd century ironworking slags:	20.5 acres.
Area of original concentration estimated at:	6.0 acres.
Estimated quantity of 2nd century slags produced:	300,000 tonnes.
Estimated amount of crude ore smelted:	300,000 tonnes.

#### NEWENT:

Area of present spread of 2nd century slags:	14 acres.
Area of original concentration estimated at:	3.5 acres.
Estimated quantity of 2nd century slags produced:	175,000 tonnes.
Estimated amount of crude ore smelted:	175,000 tonnes.

#### WHITCHURCH:

As the present spread of slags can not be precisely determined no estimate is offered, however, bearing in mind the evidence from excavations, and if the whole village is overlying slag deposits, then the original concentration of slag heaps is unlikely to have covered less than 3-4 acres, probably more.

#### MONMOUTH:

The second century ironworking areas in the town centre are on top of, and alongside the later first century ones so it is not possible to assess them separately. Based on excavations at Spencer's Yard, Glendower Street School, Granville Street and the Burgage by Dixon Gate the original slag concentration is unlikely to have covered less than 3 acres. Unlike the rural areas above, most of the slag deposits in Monmouth town centre would have been levelled and re-used as hard-core during the construction of the medieval town. It has been proved by excavation that sections of the town wall were laid on a bed of

Roman cinders. It would also appear, from excavations at Monmouth School, that some slag was re-deposited during the second and third centuries as hard-core during building construction in the town.

From the above estimates it will be observed that possibly 475,000 tonnes of ore could have been smelted at Ariconium and Newent during the second century. The Wigpool outcrops were, with some certainty, the ore source for both these sites. It should also be borne in mind that the first century ironworking area near Ariconium has a present-day slag spread covering approximately 15 acres, however, bed-rock is close to the surface and much of the original concentration has been spread around by the plough, although much lies beyond the reach of the plough in ditches. The original concentration covered perhaps 3 acres which would equate to a slag heap containing 175,000 tonnes of slag produced from the same amount of smelted ore. Thus the combined quantities of ore mined and processed at Ariconium and Newent during the first and second centuries would have been around 650,000 tonnes which accords well with the estimate made by P.Wildgoose that a minimum of 600,000 tonnes of ore were extracted from the Wigpool outcrops during the Roman period.

In the eastern part of the Weald the iron industry prospered for several decades after the industry in Dean had gone into decline. This was almost certainly, as Cleere proposed, because the area was now in a position to export its surplus production to the military garrisons on the Rhine frontier via Dover, Boulogne and the Rhine.

He estimated an annual export of 400 tonnes of iron from the eastern Weald, from about 120 until 250, to the Rhine frontier and north east Gaul with a lesser amount from the civilian controlled western Weald until the end of the century and possibly into the fourth century.

Dean had no such ready export market easily accessible across a short sea crossing. By sea it is all of 480 miles to Boulogne from the Severn shore in Dean. It would take 210 miles of sailing to round the Lizard or reach the open English Channel. The complex problems of time



and tides would be a constant consideration. Logistics expert, John Peddie, estimated that, given a fair wind and a knowledge of favourable tides, a loaded Roman period naval craft could take an average of 10-12 days to reach the Bristol Channel from the Isle of Wight, 300 miles, and 7-8 days for the return journey. A return trip to the mouth of the Rhine or the Armorican coast would double the time to around six weeks (Peddie J. 1987). It is highly unlikely that the Rhine frontier was even considered as an export market for Dean iron, and a recent review of Gallia Belgica by E.M.Wightman (1985) offers no evidence to suppose that they needed Dean's surplus iron either.

Closer to Dean, following the Severan campaign, there were modest and periodic refurbishments at the Legionary base of Caerleon. The baths were repaired, only to be closed soon after 230. Some new barracks were constructed, others were re-roofed. In the 250s there was a total rebuilding of barracks for the seventh cohort (Boon G. 1987). Any iron requirements from Dean and the Wye valley would have been modest and easily satisfied by the smiths from Overmonnow. Around 290 the fortress was abandoned by the military.

The military sites in north and central Wales were in all probability now being supplied with iron from local civilian producers.

Following the murder of emperor Severus Alexander in 235 the Empire entered a period of protracted instability during which seventeen emperors came and went before the accession of Valerian and his son Gallienus in 253. In 259 the Empire split and Postumus became the first emperor of the 'Gallic Empire' of Gaul, Britain and Spain.

Since the reign of Septimius Severus the quality of the coinage too had declined. Between 215 and 270 the silver content of the radiate head coins dropped from 2.5 gm of silver to 0.04 gm of silver until they were indistinguishable from the copper coins and had probably assumed a similar value.

It might be supposed that the political and economic problems weighed heavily against a resurgence of the iron industry but it is doubtful that this was so. As P. Salway put it: 'To a Gallic emperor Britain must have appeared one of the healthiest parts of his dominions' (Salway P. 1984, 276). R. Reece, in discussing the coin decline, puts things in perspective by pointing out that the intrinsic value of the silver coins reduced by only 1% a year, much less than the rates of inflation we have become used to. The appearance of low value, locally produced, 'barbarous' copies of Imperial coins in the 270s probably enabled the lower classes to participate in coin exchange for goods for the first time. As Reece observed: 'At this point true coin use came to Britain and the British economy became more thoroughly monetized' (Reece R. 1987).

It would seem that one must look elsewhere for reasons to explain the decline that beset the Dean industry in the early part of the third century from which it was never to fully recover.

There are indications that it was a result of over-production in the latter part of the second century after the consumer market had stabilised following rapid expansion.

When demand exceeds production, especially in monopolised industries where there is no competition, the tendency is for prices to rise in the interests of greater profits. When entrepreneurial manufacturers are allowed to draw an adequate supply of restricted raw materials at a time when other producers are fully stretched to satisfy demands then the seeds are sown for a short-term rich harvest with eventual disaster when supply finally exceeds demand, especially when price-cutting, in an attempt to stimulate a decreasing demand, fails. The situation is exacerbated when alternative new markets are beyond economic reach. Terminal closure is usually inevitable.

### 12.3 NEWENT - A CIVILIAN ENTREPRENEURIAL ENTERPRISE?

The unique aspects of the second century Newent settlement have already been identified. It was a new 'town' in the countryside north of the Forest of Dean and north west of Gloucester. The road systems surrounding it were good and the River Leadon, a mile or so away, could have been utilised for shipments in the direction of Gloucester where it merges with the Severn.

It was self-sufficient, manufacturing its own pottery and almost certainly providing its own agricultural supplies. Its products were varied, dominated by iron production but clearly manufacturing lead, copper-alloy and possibly ceramic roof-tiles. It would appear to have been geared towards the expanding civilian market.

It displays all the characteristics of a permitted civilian enterprise obtaining its main raw materials from a state-controlled industry, the mines.

The cost of raw materials would be paid to the state and no doubt a hefty percentage of the profits from manufacture.

The Wigpool iron ores would appear to be the obvious source for the Newent raw material. Copper, tin and lead would also have to be acquired and paid for through the state. There is no evidence whatsoever that the very limited iron resources, local to Newent, were ever utilised during the Roman period.

One proposed statistic is worth considering here and that concerns the estimated 175,000 tonnes of slag that resulted from the ninety or so years of smelting and smithing. If we accept an ore to cinder ratio of 1:1 that would mean that the 175,000 tonnes of slag and accompanying charcoal, furnace and smithing waste would have initially required 175,000 tonnes of crude ore to smelt which equates to an average annual requirement of nearly 2,000 tonnes of ore.

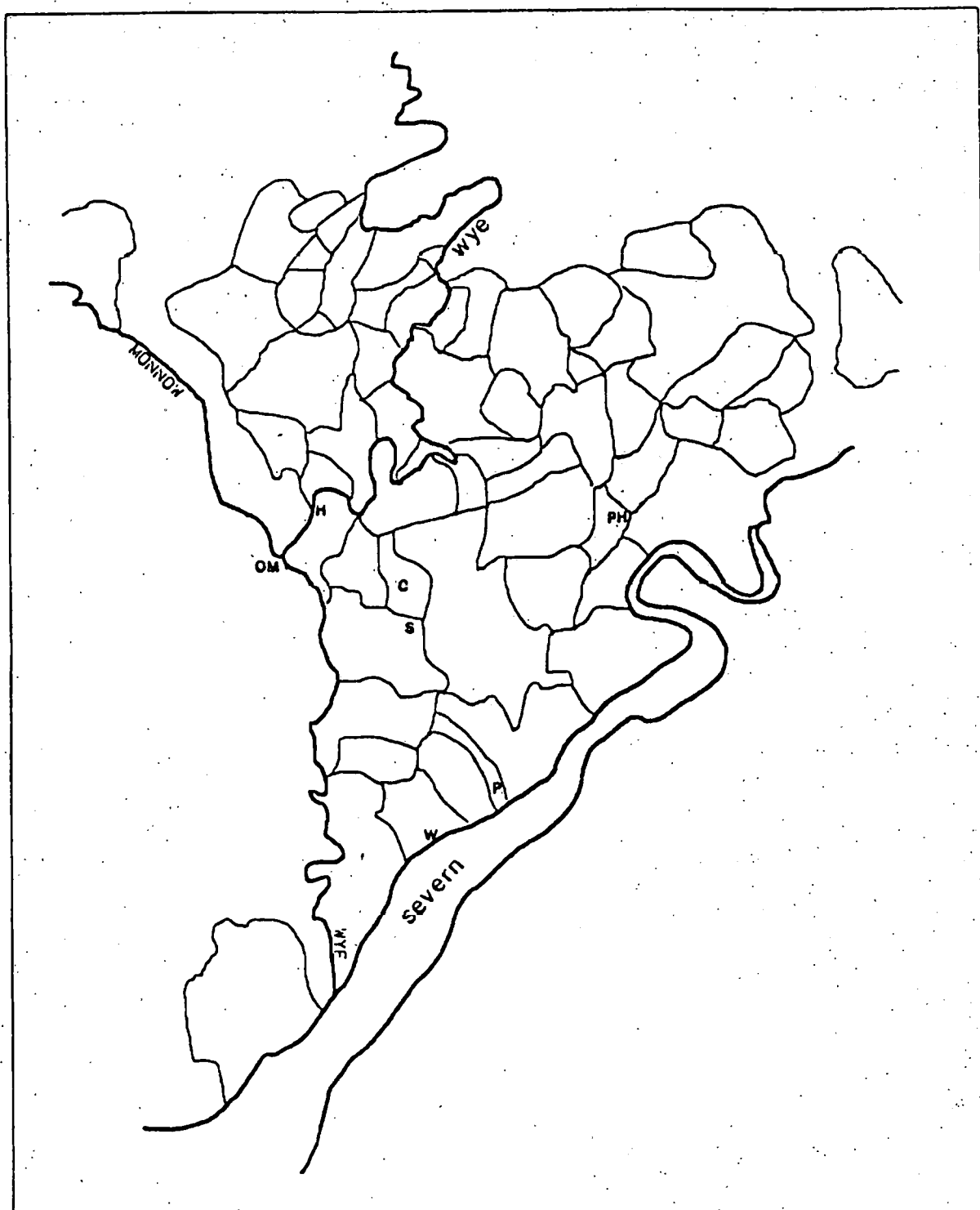
Surviving records of the Foley partnership (Hereford Record office) indicate, according to D.Bick's calculations, that for 47 years of the 112 years operation of the Elmbridge furnace, a total of 37,800 tons of cinders were used in the charcoal blast furnace allowing for 12 bushels of cinders to the ton. If there were a similar usage throughout the 112 years of operation then around 90,000 tons (91,440 tonnes) of cinders would have been consumed by the Elmbridge furnace. This would account for more than half of the slag banks produced during the 2nd century operations estimated at 175,000 tonnes.

The remaining 83,560 tonnes could be accounted for in a number of ways. There is an enormous amount of slag still lying dispersed over the ironworking area. In the main working area it probably survives to a solid depth. Probing suggests so. As Bick reminds: 'Large volumes of cinders have from time immemorial been used for road-making and hardcore.' This is particularly so where cinders are readily available. Even during the Roman period roads were repaired with them and many roads were constructed solely with slag. To this must be added the possibility that some Newent slags were exported up-country or to Ireland for re-smelting in charcoal blast furnaces.

Thanks to the fortunate survival of the Foley records the estimate of the amount of ore processed at Newent during the second century has been afforded additional credibility.

From three independent assessments it would seem that the massive civilian demands for iron during the second century had exhausted the Wigpool ore outcrops. It is also possible that the Doward outcrops west of the Wye had been exhausted by ironworking at Whitchurch and other south Herefordshire satellite sites, however this can not be confirmed without a comparable assessment similar to the one at Wigpool.

The present evidence seems to point to over-production as being the primary factor that led to the decline in the iron industry during the



### THIRD CENTURY IRON-PRODUCING SITES

MAJOR CENTRES: OM = Monmouth, Overmonnow      C = Coleford

VILLAS INVOLVED WITH IRON PRODUCTION: W = Chesters, Woolaston

P = Park Farm, Lydney      PH = Popes Hill      H = Hadnock

S = Stock Farm

early years of the third century. Allowing a licence to entrepreneurs at Newent may well have tipped the balance.

To some extent, in the later third century, the industry recovered but minus its satellite sites. With one exception iron production was now concentrated along the rivers Severn and Wye.

#### 12.4 FROM DECLINE TO A MODEST STABILITY

Following the closures iron-working of any consequence continued for the next few decades at one site only, Monmouth (Overmonnow).

At Monmouth a new iron-working area was opened up south of the town and the Monnow river, in Overmonnow, and continued in production well into the fourth century. The main area of iron-working is to be found within a 250m by 500m ditched area now called Clawdd Du (The Black Ditch). Slag deposits five feet thick containing Roman pottery have been identified in St. Thomas' Square. An excavation in the Old Vicarage Gardens revealed furnace remains and an excellent collection of Black Burnished pottery of 3rd and 4th century forms as well as Oxfordshire colour-coated wares. Furnace remains at Fitzroy Close were associated with third century coins and Roman pottery. Beneath Cinderhill Street are thick layers of bloomery slag.

Around the middle of the third century some of the villa sites began smelting and smithing activities.

The earliest of these may have been at Popes Hill, Littledean where residual samian was associated with third and fourth century heavy slag deposits. A timber structure had stood nearby (see Littledean CP). No villa has yet been identified but numerous finds of Roman brooches, coins and lead artefacts on the nearby Chestnuts Hill, combined with the quality of the pottery found by Scott-Garrett in his excavations suggest their source as a villa.

At Chesters villa, Woolaston, excavations by M.Fulford from 1988 to 1990 revealed an industrial building with sixteen bays, measuring 16.5m by 8.2m. It was of post built construction on two parallel rows of pad-stones. Several shaft-type furnaces were confirmed and an ore-crushing unit. The iron-working phase on limited pottery evidence was given a terminus post quem of the mid-3rd century (Fulford M. 1991). Dense layers of re-deposited slags were used nearby as a landing stage to the estuary inlet.

At Hadnock villa the iron-working phase may be allotted to the mid-3rd century and later although there is no close dating for the slag deposits.

Limited smelting and smithing also took place at the Park Farm villa, Lydney although again the slag deposits are not dated. The iron-mining phase at Lydney Park could well be associated with the villa. Here Wheeler dated the mining phase as middle to later third century (see Lydney CP) and Wheeler REM & TV. 1932). By no means has all of the mining activity been dated as the temple site is overlying a complex mining system. The very existence of the mines is somewhat remarkable as ore outcrops exist as far as the major scowles at Bream which are less than 2 Km north west of the temple site. Could it be that the earliest of the outcrops to be mined in this area had also been exhausted by the second century over-production ?

It is probable that the Lydney tunnel mines produced far more ore than was ever smelted at the Park Farm villa. Could the Chesters villa also have drawn its ore from Lydney ?

It would certainly appear that, Lydney apart, most of the ore was now being drawn from the ore outcrops south of Coleford, possibly from the Noxon area (G64). Third century coins have been found alongside the ore outcrops in Scowles village (G12), and at Perrygrove scowles (G60) upwards of 3,000 mid-3rd century coins were found in 1849, both officially minted and 'barbarous' radiate copies. Interestingly, they were found hidden in jars in a crack in the quarried out scowles which

tells us that the particular scowle had long since been quarried out and that there was no further danger of mining operations disturbing the cache.

The villas at Boughspring and Huntsham have produced few slags and what is present is almost certainly related to smithing of forgeable iron bars. Huntsham, an essentially agricultural-holding villa is hardly likely to be smelting when Monmouth and Overmonnow lie some seven kilometres downstream and so much closer to the mouth of the Wye. The Hadnock villa is only 2 Km north, and in view, of Monmouth and may well have been the out-of-town home of iron-masters.

In summary: Three of the villas, those at Woolaston, Hadnock and Popes Hill have yielded sufficient quantities of slag to suggest that they produced iron surplus to requirements and may have been involved in modest commercial trading. Equally possible is that they exchanged part of their surplus for such as meat and grain with other estate managers. The land immediate to Popes Hill, for example, is suitable for livestock rearing, but not arable farming. The limited amount of land surrounding the Huntsham villa, in a loop of the Wye, is good agricultural land. The recent re-assessment of Bridgewater's excavation there suggests that the estate may have been malting barley and producing liquor in some quantity - a very desirable exchange product (See Taylor E. Trans. WNEC, forthcoming). There is only pasture land west of Stock Farm and no evidence at all for arable farming. Evidence is discussed later which indicates that the Boughspring villa estate was probably responsible for extensive arable farming on prime limestone soils. It would seem entirely reasonable that the owners' surplus produce was exchanged.

#### **NEW TEMPLE FOR THE COLEFORD IRON-WORKING SETTLEMENT**

Around this time, in the early third century, a remarkable new building was constructed for the community of iron-workers at Coleford (High Nash) - a timber built temple of considerable proportions.



Mature trees were cut lengthways and laid snugly in round-bottomed foundation trenches 60cm wide at the rear of the temple and 50cm wide down the sides. Broad beams either side of the aisles supported the roof which was tiled with a greenish sand-stone obtained from quarries, the nearest of which is 1.5 Km away. At the west end was a semi-circular apse, 9m wide and 4.5m deep.

The east-facing front foundations of the temple had been destroyed by a new road laid as access to an industrial estate in 1985, however rescue excavations by Dean Archaeological Group revealed the rest of the temple plan and sections of the temenos wall.

The temple was 14m wide and may have been 26m long including the apse. About 5m outside of the apse, within the temenos, a large buried sandstone plinth was discovered which may have been the base for a cult figure.

Opposite the front entrance to the temple was another structure, also rectangular in form, with a shallow central pit in front of a flat, hard-packed surface. Graham Webster suggested that this too may have been a small shrine. It faced east, and was originally constructed in the early 3rd century with later 4th century re-construction.

The temple was built on a site that had been sacred to the local Britons for centuries. The Celtic Warrior burial deposit was located just 92.5m behind the apse.

That the temple was constructed during the years of decline in the iron industry is reasonably certain. This may appear to be a strange time to develop a settlement that was in grave danger of disintegrating. Closer consideration of the circumstances may indicate that it was an auspicious time.

The impending disaster of impoverishment might have concentrated the minds of the Britons on intercession with their gods who had been so benevolent towards them for so long. Maybe they felt that a new and

very imposing structure was necessary to placate the deities and restore good fortune. One notable fact is that among the dedicatory deposits found buried in the temple foundations were TWO IRON HORSE-SHOES.

The horse played a significant part in Celtic religion. Although no longer circulating, Dobunnic coinage had featured a triple-tailed horse. Many other Celtic tribal coins had featured the horse. Objects associated with the cult of the horse have been found in association with depictions of Tanaris and a wheel, a god favoured by smiths (see Webster G. 1986). Such a wheel was found, cast from lead, at the Newent iron-working site. An iron horse-shoe is still considered a symbol of good-fortune and a protection against evil. It may have been considered so since horses were first shod by the Celts. For certain, horse-shoes had a very special significance for the Coleford community.

The labour force was likely to have been restive, available and in need of employment. Even if supplication to their deities failed to invoke a successful response the construction of such an edifice would perhaps have introduced an air of optimism when all must have felt an overwhelming pessimism. Perhaps it was all there was left to do.

There was never to be a great revival of the industry during the Roman period. By the end of the century the most that could be claimed was that it had attained a modest stability.

## 12.5 THE END OF THE OLD AND THE BEGINNING OF A NEW CENTURY

The last decade or so of the third century sounded echoes of the closing years of the second century with political unrest and a usurping emperor for Britain and parts of Gaul.

Soon after his ascendancy in 284 Diocletian realised that the government and defence of such a vast empire was too great a task for

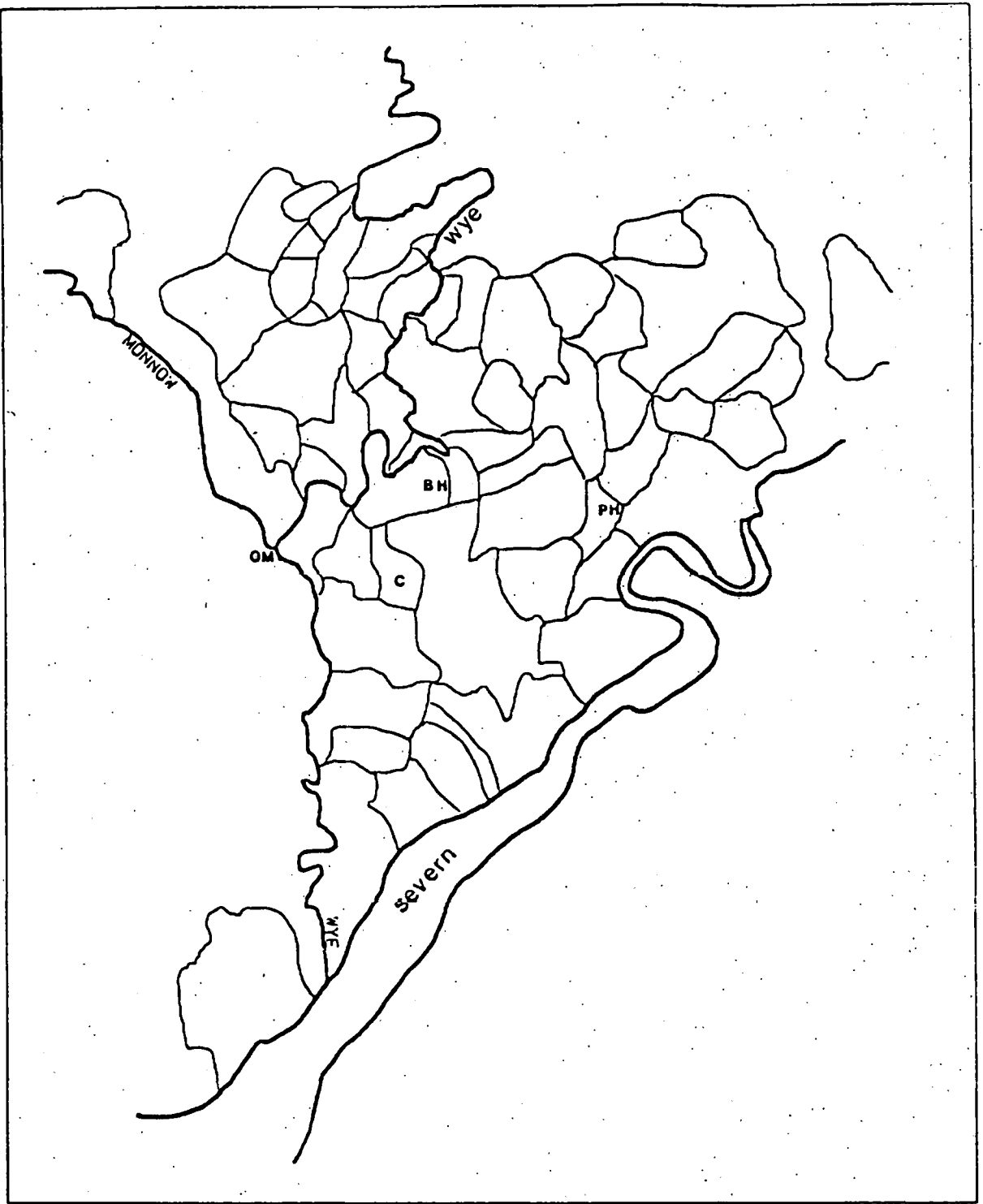
one man. On April 1st 286 he conferred upon Maximianus the rank of Augustus and placed him in charge of the western half of the Empire which included Britain. Soon afterwards, Carausius, now the Commander of a Channel fleet based at Gesoriacum (Boulogne) sailed for Britain and took possession of the Province, proclaiming himself emperor.

He endeavoured to present an image of one who cared for the rich landowners and those with commercial interests by introducing a silver coinage of such fineness that it matched the quality of the coinage of the Republic and early Empire. It would not have impressed the working class for the value of it was way beyond their reach. What it probably did was to ensure the continued use of the 'barbarous' radiates of lower value which, through various coin reforms, probably continued in circulation for the next forty years. One effect of the Carausian coin reform would have been to increase or extend the mining of silver in Britain which was then coined at newly opened British mints. Prior to the reform of the coinage c.290 the early coinage of Carausius reflected the earlier radiate coinage but with slightly larger flans and heavier weights. These early coins are frequently found as single coin finds in Dean (Reece R. 1987 & Salway P. 1984, 296-300).

In 293 Carausius was assassinated at the instigation of his finance minister, Allectus. Three years later Britain was restored to central European government when Constantius Chlorus successfully invaded in 296.

Almost immediately Constantius drew on the skills of British craftsmen when a large number of 'artificers' were required to restore the important city of Autun in Gaul. The anonymous Panegyric (eulogy) of Constantius delivered in 297 proclaims that Constantius drew the skilled men from the British provinces because 'those provinces had a surplus of them' (See Mynors RAB. 1964 VIII (V), xxi.2).

This observation is noteworthy because, as we have seen, in some vital crafts there would have been a surplus of labour from the early years of the third century in Dean. From the middle of the century, when the



#### FOURTH CENTURY IRON PRODUCTION SITES

OM = Overmonnow      C = Coleford      PH = Popes Hill      H = Hangerbury  
B = English Bicknor

Classis Britannica was withdrawn from its Dover base, artificers from the Weald would have been available for alternative employment when, in the eastern part, iron production ceased (Cleere H. 1981,189). By the end of the century it would seem that descendants of these craftsmen were still too numerous and surplus to requirements, which also indicates that the British economy was in need of stimulation.

### 13. THE FOURTH CENTURY IN WYE/DEAN

#### 13.1 AN IMPRESSION OF OCCUPATION AND ACTIVITY

Before considering the wider historical background it would be of value to summarise the fourth century available information for the region as presently discerned from mainly recent archaeological discoveries. The following is a survey of sites producing evidence for fourth century occupation:

##### ARICONIUM

Ariconium's existence, once the iron industry had ceased, depended very much on its being a staging post on the XIIIth Itinerary between Gloucester and Monmouth. As observed earlier, there is no evidence in surrounding fields for arable farming although stock rearing cannot be discounted. Fourth century coin finds are common but the sequence ends in the 360s. It was well supplied with red colour-coated table wares from the Oxfordshire kilns which were supplemented by the occasional acquisition of drinking vessels from the Nene Valley. Occupation must have been restricted to a few buildings of substance on and close to the site occupied in the earlier first century by the native settlement. One of these buildings would presumably have been the Mansio. The apparent termination of the site, probably within a very few years of 370 suggests either the culmination of a gradual decline in official travellers or a preference for an alternative route to and from Gloucester using the coast road along the south side of the Forest, close to the Severn and the villa sites. For the last century

and a half of its existence Ariconium must have presented the image of a depressed and depressing area surrounded by slag heaps, rubbish dumps and dereliction, the kind of place that travellers would prefer to pass through quickly except that the next stopping place was Monmouth which was probably noisier and dirtier but still had a thriving community.

#### MONMOUTH

The Mansio at Monmouth has not yet been located but the site of Monmouth School would seem to be the obvious place. Large amounts of quality 2nd to 4th century pottery were found beneath the school grounds by A.L. Sockett and his pupils during the 1960s whenever ground disturbance offered an opportunity to investigate lower levels.

In OVERMONNOW iron-working continued well into the fourth century and extended beyond the Clawdd Du area. At Bailey Pit a furnace site was located through finds of iron ore, smelting slags, furnace lining, vitrified sand-stone and crucible sherds which suggested lead or copper working. The pottery was 4th century and included Oxfordshire white ware mortaria and colour-coated wares. It is appropriate to observe here that fourth century Oxfordshire colour-coated wares are very common throughout Dean and the Wye Valley indicating overland distribution to Gloucester and probably distribution by river from there although both roads and rivers may have been used. Coleford, which is far from either rivers, had a rich supply of Oxfordshire mortaria.

#### COLEFORD

The High Nash rescue excavations provided evidence for a modestly flourishing settlement throughout the fourth century. On the temple site, within a few years of 300, the apse was removed and the foundation timbers to the rear of the temple were replaced with slightly wider timbers suggesting a strengthening of the structure. Mid-century the temple was demolished as was the 'shrine' opposite the temple entrance. The temenos timber wall was removed. The foundation ditches of the temple and the temenos filled with silt to which was

added many fragments of 4th century pottery, notably Black Burnished wares and Oxfordshire flagons of which there were many. Silting continued for some time before a new shrine was constructed on the site of the earlier temple but on a slightly different alignment, still basically east - west. The shrine was simple and small, rectangular in form, set on timber beams laid on the ground surface. This in turn was replaced in the late 4th century by what could only have been an altar set beneath a covering supported by posts on pad-stones. The building opposite was renewed, probably at the same time as the rectangular shrine. Beneath a new cobbled surface were some crushed slag fragments which contained a coin of 330-335. The coin had been lost in the slag and had been re-deposited with it as hard-core. It may have been in the slag for some years before re-deposition beneath the rebuilt shrine. It is interesting to note that, although the temenos timber wall was never re-constructed its boundary was perpetuated by a long line of large stones which lay exactly above the centre of the filled-in foundation trench.

Just 70m SSW of the temple site a residual dump of unused but crushed ore was found on a late fourth century surface.

In the final 'altar' phase of the site nearby clays had been used to make pottery in simple bonfires. This was confirmed by a pottery firing experiment undertaken by archaeology students from the Royal Forest of Dean College in 1988. Clay was extracted from the site and the students constructed late-Roman-form pots which were fired, on-site, under oxidising conditions. The resulting fabrics closely matched wasters from late-Roman firings found on site. It would appear that Dorset and Oxfordshire wares had either ceased to reach Dean by this time or else there was very restricted availability, for copies of both forms were found during excavations. With reasonable certainty the site functioned into the early years of the fifth century.

## ENGLISH BICKNOR PARISH

## HANGERBURY (Barnfield)

This was the first Roman-period smelting site to be excavated in central Dean by the Dean Archaeological Group in 1987. The field, 650 feet (198m) above sea-level, contains three roughly circular areas of concentrated slag and furnace debris, each about 20m in diameter. Excavation on one of them revealed slag to a depth of 35cm. A shaft-type furnace had been constructed from clay extracted from an adjacent pit. A very quartzzy piece of sand-stone had been used as the furnace base on which the 27cm internal width shaft had been built. The slag had tapped from the furnace into the clay extraction pit and three distinctly different smelts were to be observed. The first two flowed into the pit after which the pit had been filled with debris. The third flowed across the top of the pit.

The stratified pottery sherds were all main production Severn Valley Wares and not therefore closely datable, however a nearby surface find of a Centenionalis of Constantius II with a Christogram reverse and minted at Trier in 353 very strongly suggests a mid-later 4th century date for the smelting. The dating is substantiated by another nearby surface find, a rim-sherd of 4th century Oxfordshire colour-coated mortarium.

Not far from the smelting site, on the summit of Hangerbury Hill are iron-ore outcrop scowles, clearly the ore source. The slag remains, covering between half to three-quarters of an acre, have not been much spread about by the plough and may represent former banks of 20-25,000 tonnes in total. The appearance of this smelting and primary smithing site so late in the 4th century may well be further evidence that the major ore outcrops were by now exhausted or on the point of being so. Beside a trackway which leads to the Lydbrook valley and the Wye, in a neighbouring field, a typical Roman-type 2½lb forgeable iron bar of square section was found. Production would appear have been far in excess of local needs and it is probable that some of the iron was being shipped away by river. Whether upstream into Herefordshire or downstream towards Monmouth cannot be conjectured.



#### COWMEADOW FARM, ENGLISH BICKNOR CP

Across the valley from Hangerbury, on another ridge, a small Roman-period smelting site was located on the above farm. A partly-worked billet was found, the shaped part of square section, close to a 20m diameter spread of slag. More slag may be in the next field which is unploughed and rough. Surface pottery was again fourth century and including an Oxfordshire colour-coated mortarium rim. The rim of a pewter dish was also found. Hangerbury would have been the ore source.

Both these sites were new although Hangerbury had occupation in the first century AD. The only possible continuity link is the Lydbrook 'villa' site overlooking the Wye which seems to have survived the centuries. Among its latest pottery was the almost-ubiquitous-by-now Oxfordshire colour-coated wares.

#### LITTLEDEAN CP

##### DEAN HALL

The temple site at Dean Hall was still flourishing in the 4th century and a coin of Magnentius was sealed beneath the latest phase. This may coincide with the phase two reduced-size temple at High Nash, Coleford.

Except for the possible villa site at Popes Hill none of the ironworking areas around Littledean have yet been dated within the Roman period although slag fragments have recently (1992) been excavated from a late-Roman road surface that passes within 75m of the temple.

#### LYDNEY TEMPLE

Wheeler's dating of the temple complex to the 360s has always been taken as the classic textbook example for the revival of paganism in the late Roman Empire. However, coin research and trial excavation by J. Casey of Durham University in 1980 caused him to propose an earlier phase of the Long Building which he dated as being either late 3rd century or very early fourth. This tied in with Eric Birley's earlier observations that the inscription concerning the gift by a naval

officer of the fleet of a mosaic pavement to the temple could not have been later than the third century. Casey's conclusions were that the late fourth century work described by Wheeler was in fact a refurbishment of the temple complex which was begun in the late third century (Trans.BGAS 1981,178 note); (Current Archaeology 76, May 1981,149).

It should be pointed out that there is not general agreement about the interpretation of the fragmented and abbreviated inscription or the dating of the mosaic. The donor or initiator of the tessellated pavement in question, believed to be one Flavius Senilis, is not so much in question as his rank or office which was abbreviated to PR REL. This has for long been accepted as pr(aepositus rel(iquationi) classis, the officer in charge of a supply depot belonging to a fleet (see Collingwood RG, in Wheeler & Wheeler, 1932,102-103). Mark Hassall proposed that the abbreviated title could be interpreted as: pr(aepositus rel(igionum), the superintendent of rites - i.e. a priest or temple official (Hassall M. in Rodwell W. 1980). Martin Henig agreed with Hassall and restored Senilis to the mid-late 4th century (Henig M. 1984). More recently R.P.Wright in Britannia 16 (1985) argues for pr(aepositus) rel(igionis), superintendent of the cult. Wright proposes that the text of the inscription should now be interpreted as: 'For the god Mars Nodens Titus Flavius Senilis, superintendent of the cult, from the offerings had this laid; Victorinus, the interpreter (of dreams), gave his assistance'.

Either, or neither, may be correct, however, there is a further factor to consider: Recent research indicates that Lydney was a key port during the later Roman period, and by inference, a supply depot (see 18.2). Even so, the recent interpretations by Hassall and Wright seem more convincing and likely.

Whatever, the coin sequence ends with Honorius so the temple use survived well into the 5th century which in itself is remarkable for a pagan temple.

## CLEARWELL

## STOCK FARM VILLA

This building, unexcavated, and potentially the residence of a mining administrator, should have continued at least as long as ore was being extracted from the adjacent mines or others nearby. All that can be said at present to confirm a fourth century occupation is that Oxfordshire and Nene Valley colour-coated wares have come from trial excavations close to the villa. It should be added here that the substantial local evidence is that, although Oxfordshire white ware mortaria were reaching the region in the third century, the colour-coated wares did not travel west of the Severn in any discernible quantity until the fourth century where they are found in the very latest Roman contexts.

## CHESTERS VILLA, WOOLASTON

Scott-Garrett and Harris excavated the two period baths' systems in the 1930s. They saw an hiatus between the first period, in the early fourth century, and period 2 which began after 320. A platform feature on higher ground just to the north of the building was interpreted as a 'lighthouse' to guide shipping into the Pill (creek) around the submerged Guscar Rocks. It was placed in period 2, fourth century. The latest coin in the sequence was of Gratian, minted in the 370s.

The main villa building revealed by a DAG aerial survey in 1989 is unexcavated. That it was heavily buttressed and therefore possibly multi-storey in its latest phase is discernible from the crop-marks. It would be interesting to know if its phasing reflects the excavated evidence from the baths. Although all the villa buildings around Dean which have received some excavation show several periods of structural development, which is to be expected, only the Chesters villa suggests an hiatus without occupation during which there was a build-up of inter-phase soil. No iron-working on the villa site has yet been dated to the 4th century.

## TIDENHAM CP

## BOUGHSRING VILLA

At the nearby Boughspring villa the mid-4th century saw major developments when the earlier winged-corridor villa was converted into a baths system and a new multi-storey building was erected in front of it on a platform. Only a small amount of pottery was available for the report put together by Joyce Pullinger in 1990 but Nene Valley and mainly Oxfordshire colour-coated wares were again present. The latest of the coin finds was an AE3 of Valens (AD 364-378) but it had been well circulated. Some small amount of iron-working took place near to the villa but the precise location and therefore the extent of it is unknown.

## HADNOCK VILLA. near MONMOUTH

Still functioning in the fourth century but no excavated evidence. No proof of fourth century iron-working.

## HUNTSAM VILLA, GOODRICH CP

Also functioning in the fourth century but more evidence awaited from an excavation summary. There is no evidence for 4th century iron-working which, in any case, would have been extremely modest and for estate requirements only.

## PARK FARM VILLA, LYDNEY CP

Still functioning in the fourth century but further excavation required. No dating evidence for 4th century iron-working.

There are still two vast tracts of land which have so far not been discussed. The first is known as THE BEARSE and occupies roughly ten square kilometres between St.Briavels to the west, and Bream to the east. It is on a plateau of land which rises from the Severn. To the north is Coleford. On its eastern boundary are the ore outcrops stretching from Bream to Perrygrove. Roman-British pottery sherds and rims are to be found on nearly all of its ploughed fields but in no great quantity and most are very abraded. No occupation site has been found within the area and there is no concentration of finds to

suggest one. It is prime agricultural land and most of it is still cropped annually.

The pottery finds can be interpreted as midden waste dispersed with compost onto ploughed fields from the mid-2nd to 4th centuries. It is suggested that it may have been Dean's primary production area for mainly cereal crops. Cereals are still the main crop. The only discernible land division is what is probably a Roman trackway which bisects the area from east to west and from Bream Cross to Bearse Farm. The track is in a straight line from Bream to Bearse Farm, passing by Roads Farm. It then continues past Mork (where Roman brooches and 2nd century coins have been found) to Bigswear on the Wye.

The second and largest tract is woodland. There is still in excess of 20,000 acres of tree cover. It was of primary importance to the iron industry and will be discussed under 16. THE EXPLOITATION OF DEAN'S TIMBER.

### 13.2 HISTORICAL EVENTS OF THE 4th CENTURY AND THEIR IMPACT ON DEAN

Attempting to relate fixed historical events, especially of the Roman period, to archaeological discoveries is fraught with difficulties. Most archaeological dating is inexact usually offering 'a date before which....' or 'a date after which....' or 'a date around which....'. Within Dean the problem is compounded because not a single group of villa buildings has been completely excavated, some not at all. The concept of open area excavations did not exist and the meagre regard given to stratigraphical recording must leave one doubting some interpretations. None have been published to present day standards. Some final reports were never published by the excavators.

Despite the problems an attempt will be made to relate some of the archaeological discoveries to historic events that affected Britain as a whole.

Not later than 314 Britain was split into four provinces Dean becoming a part of Britannia Prima. Each province had its own governor and a whole new bureaucracy was formed to co-ordinate administration in Britain. The Governors were now civil officers having no command over the troops. The reforms of Diocletian were being carried through under Constantine I (The Great).

P.Salway observes that 'From around AD 300 there is a veritable epidemic of work in Britain on country houses - from improvements in the amenities of modest houses to vast extensions that convert relatively small country properties into grand mansions in the manner of the stately villas of Gaul' (Salway P. 1984,329). Many towns added defences or constructed new defences.

Within Dean, at the moment, one can only point to the fourth century developments at the Woolaston and Boughspring villas, especially the latter. Most of the numerous villas east of the Severn in Gloucestershire demonstrate fourth century improvements.

The effect of this upsurge in development is not apparently reflected in an increase of iron output from Dean, rather it helped to sustain the industry at a level it achieved by the later-3rd century after the slump.

The amount of ore processed on a few sites can be estimated:

In Overmonnow the 3rd century ironworking deposits cannot be distinguished from those of the 4th century. Production was probably continuous. Based on evidence from several excavations and observation of contractors' trenches the total slag spread may cover upwards of 10 acres. Very little of the area has been subjected to the plough so the deposits appear to be well concentrated still. Allowing for 5 acres of originally concentrated slag heaps would suggest that around 125,000 tonnes of ore could have been smelted during the 3rd and 4th centuries. It was certainly the largest iron production settlement in the whole region during that period.

Smelting at Hangerbury probably consumed around 25,000 tonnes of crude ore.

Coleford was an important smelting and processing centre in the 4th century but it would be too speculative at the moment to estimate the ore consumption. Greater effort needs to be made when slag deposits are revealed by ground disturbance in the town centre to acquire datable evidence.

Over the past year, 1991/92, several small 4th century ironworking sites have been identified close to the Severn, especially in the parish of Awre and close to Blakeney. They are far from any known villa and it must be considered that a villa remains to be discovered. At Viney Hill, in Awre parish, there is a Chester Leye field name and Romano-British pottery sherds have been found but no traces of an occupation area. Datable pottery finds on all of these sites is late 3rd/4th century with Oxfordshire wares consistently being found.

The long period of stability under Constantine was to end within a few years of his death in 337. His son, Constantine II succeeded as Augustus of the west including Britain, while his other son Constans controlled Italy and Africa. A third son, Constantius II, held Constantinople and the east. In 340 Constantine II invaded the territories of his brother and was killed, thus Britain came under the rule of Constans. He visited Britain in 343 and his sole rule over the western provinces lasted for ten years until the legions revolted against him and joined forces with Magnentius who became ruler over Britain in 350. Inevitably drawn into battle against Constantius II he was finally defeated in Gaul in 353 and the province of Britain came under the control of Constantius.

The next year or so may well be reflected by some archaeologically recorded events in Dean.

Constantius was aggressively Christian with an intense hatred of the old religions. He ordered the immediate closure of all pagan temples and re-affirmed the death penalty to those who made pagan sacrifices or worshipped images of their gods. This not only terminated the state religions but also struck at the heart of the deeply rooted Celtic beliefs of the masses of ordinary people. The civil administrators were obliged to act on the decree out of fear for their lives because Constantius had sent to Britain his Imperial Notary, Paulus, whose reputation for hunting out dissidents and potential opponents to his Emperor was well known by the administrators and land-owners in Britain. Tortures, imprisonments and death were common. Innocents became the victims of informers out to protect their own lives. The wealthy suffered most (See Ammianus Marcellinus Book XIV,6-9).

The archaeological evidence suggests that the decree of Constantius against pagan worship may have been more effectively applied in urban centres and that away from Imperial influence paganism still flourished. This is certainly true of Gallo-Belgica. Christianity appears to have been essentially town-based (for a fuller discussion see Esmonde Cleary AS. 1989).

Whatever, the situation may have eased a little in 355 when Constantius appointed his young cousin Julian to the rank of Caesar over Britain and Gaul. Julian was quite a different sort of person having a passionate interest in and knowledge of Roman history, religion and tradition as well as Classical literature. In 359 he organised for 600 ships to transport corn from Britain to the lower Rhine armies which tells us that Britain still had a major reserve of resources.

In 360 Julian's troops in Britain proclaimed him Emperor and in the succeeding months Constantius II died. Julian restored traditional observances. It is probably around 353 that the Coleford (High Nash) temple was demolished and the ditches and foundation trenches silted up only to be renewed in a lesser form some years later.



At Dean Hall the final temple phase, given a *Terminus Post Quem* by the coin of Magnentius, could well have begun during the reign of Julian.

It is most unlikely that the decrees of Constantius made any difference to the working population of Dean. Forbidding worship simply drives it underground and perhaps literally so for Dean's mining and iron-working community. In any case, the forests, rivers, streams, swallow holes and springs were natural visible images of their spirits, ever able to accept discreet and surreptitious offerings.

P.Salway summed up the 360s thus: 'I suspect the towns were by and large, much poorer, politically inactive, and socially weak, but by no means dead. If they were temporarily in disarray, I believe it was as part of the general malaise of Britain, not something peculiar to themselves' (Salway P.1984,373).

The next event, also recorded by Ammianus Marcellinus, occurred during the reign of Valentinian in 367: 'Valentinian was shocked to receive the serious news that a concerted attack by the barbarians had reduced the provinces of Britain to the verge of ruin. Nectaridus, the count of the coastal region, had been killed, and the general Fullofaudes surprised and cut off.' Ammianus continued: 'Finally, in response to the alarming reports which constantly arrived, Theodosius was selected for the task and ordered to proceed to Britain without delay' (Ammianus, Book 27,VIII).

Probably by 369 Theodosius' initial task of clearing out the invaders was completed and the task of restoration was begun.

There is no obvious archaeological evidence around Dean for destructive attacks by barbarians at this time. Across the Severn at the Frocester villa site, which would have been an obvious target, the excavator, Eddie Price, advises that in 367 the villa was thriving, at its zenith with no evidence of attack or destruction (Pers. Comm. E.Price).

Likewise at Woolaston villa where, if Scott-Garrett's interpretations are to be accepted, the hiatus occurred during the early fourth century, and in the 360s it was thriving. The Chesters villa would have been extremely visible from the river as would the Boughspring villa but neither apparently reflects directly the 367 incident.

Attention will now be drawn to the local coin hoard evidence for the mid-4th century but will avoid offering what could be misleading conclusions.

At Oldcroft, 3 Km from Lydney in West Dean CP, alongside the Dean Road a hoard of 3,333 coins was found in 1972/73 including many uncirculated coins of Constantius II of the FEL TEMP REPARATIO type with some die-links. The latest coins were of Julian II so the hoard was judged to have been deposited in or after 359. The hoard also included some silver bullion items and a rare silver pin with champlévé red enamel decoration on the pin head of Celtic design (Rhodes J.F. 1974).

During 1991 a second coin hoard was excavated by Dean Archaeological Group close by the deposition spot of the first hoard. In all 548 coins were retrieved, mostly of Constantius II. The excavation revealed that they had originally been concealed in a dry-stone field boundary wall which ran parallel to the Roman 'Dean Road'. Deposition was after AD 354 (Walters MJ. 1991).

At High Woolaston, 1.5 Km north west of the Chesters Villa about 250 coins were discovered under a stone in 1887. 183 were reported on by G.Boon, the latest being c.348 (Bagnall-Oakley ME 1894/95 and Boon G. 1960).

At Bishopswood (Walford CP) on a hillside 250m above the Wye: Over 17,000 coins, 16,070 of them minted during the period 330-335. The latest coin dated to 348. There is no known 4th century Roman occupation site within several miles of this hoard but the site is now in private woodlands which are difficult to investigate.

In summary, two hoards were alongside a Roman road, another near a villa and the fourth close to the Wye and probably within ancient woodlands.

### 13.3 THE END OF AN ERA - THE LATE FOURTH CENTURY

At some time during the last two decades of the fourth century the Chesters, Woolaston villa was abandoned. Crude repairs and patching of the Period 2 floors suggest a decline in prosperity prior to abandonment. Soon after the desertion by its owners, and probably while the roof was still intact, a circular hearth had been cut into the floor and used by temporary occupants, described by Scott-Garrett as '...a sort of squatters' occupation' (Scott-Garrett & Harris, 1938)

At the nearby Boughspring villa there is also clear evidence for abandonment with the villa left to crumble over a period. At some point after the building was ruined a grave was cut through the floor of a corridor room (Pullinger J. 1990).

Late Roman coins are rare in Dean, only on the temple sites of Lydney and Littledean have they been found; an early coin of Arcadius at Littledean issued before 388; at Lydney nine of Arcadius and one of Honorius.

Writing in the early 6th century, Zosimus records that around 409 'The people of Britain, taking up arms and exposing themselves to danger on their own behalf, liberated the cities from threatening barbarians; and all Armorica and the other provinces of Gaul, imitating the Britons, liberated themselves in the same way; they threw out the Roman officials and within their power set up their own order' (Zosimus VI,5,3). In 410 the Britons were told by Honorius to defend themselves (Zosimus VI,10,2). Zosimus' information did not come first hand, he was also writing from the eastern part of the Empire a century later, so there is an ongoing discussion as to the historical worth of the text (See Esmonde Cleary AS. 1989).

One fact is not disputed and that is that the Romans surrendered their administrative hold on Britain around 410/411. Without an authorised military presence and with no troops to pay, the coin supply to Britain ceased. The latest bronze issues to be sent here were from Rome between 395 and 402. The latest silver and gold coins found in Britain were minted during the first decade of the fifth century. Revenues and taxes ceased to be paid to Rome. Silver and gold coins were hoarded but none have been found in Dean. There would have been a general reluctance to pay any taxes now so that the towns too declined (Esmonde Cleary *ibid.*).

It would seem that some foresaw that the economic decline of the last decades of the fourth century would result in eventual disaster and moved from Dean.

The small local population that remained were left to produce and provide for themselves much as they had been doing 350 years earlier before the Roman invasion of the region.

#### 14. POST ROMAN DEAN

The evidence is naturally scant and hard to fix. The termination of a money economy was probably no problem for the population, few of them being able to make use of the high value coinage during most of the Roman period, although it is just possible that some were allowed to accumulate debt then pay it off with high value coins at infrequent intervals.

That they continued to use pottery for their everyday needs is both logical and attested by the copying of late Roman period designs at the High Nash settlement, Coleford.

It is quite possible that some 4th century Oxfordshire table wares survived into 5th and 6th century contexts. The deserted villas would certainly have been 'robbed' of any usable, unbroken leftovers. One

such example of probable survival was an Oxfordshire hemispherical colour-coated bowl found at Courtfield, Welsh Bicknor parish, which is the site of a Dyfrig foundation c.575. No Romano-British settlement is anywhere near to where it was found on the north side of the Wye opposite Lower Lydbrook.

From a spring area near Roads Farm on the Bearse (St.Briavels CP) a Roman altar was dredged out in the 1970s. It had been defaced on all four sides by crude inscriptions with 'NO' repeated. No translation has so far been offered and it has been assumed to be a Christian defacement and disposal. One cannot help associating the 'NO' with Nodens (Heighway C. 1984 in Saville A.). The altar and inscription has not yet been reported in 'Britannia'. It is now on display at the Dean Heritage Museum.

Fifth century iron needs would be minimal, mainly agricultural and forestry implement replacements. Some of the small undatable slag sites could well be immediately post-Roman but there is no way of determination at the moment.

The Dyfrig foundation at Welsh Bicknor (Llan Custennin Garth Benni - The Church of Constantine with an appointed enclosure) c.575 is the earliest of the Christian foundations in this area. Others followed at Llandinabo c.585, The Doward c.620, Lancut c.625 and Tidenham. All were given grants of land, arable, pasture and woodland. There was clearly a population of some substance for them to serve and, in all probability, the same people served the monks and priests by cultivating their land endowments (Davies W.1978 and Davies W.1979).

The Saxons did not impose their presence until the late 6th century following the battle of Dyrham. For almost two centuries following the departure of the Romans, the people of Dean and its surrounding areas must have enjoyed a period of peaceful self-sufficiency. Woodland renewed itself and nature began to claim the exhausted and deserted ore outcrops. The slag heaps were to remain for more than a thousand years as testimony to the exploitation of resources by the Romans.

## 15. AN ASSESSMENT OF THE EXPLOITATION OF DEAN'S IRON AND TIMBER RESOURCES FIRST TO FOURTH CENTURIES AD.

### 15.1 THE EXPLOITATION OF DEAN'S IRON RESOURCES

So far assessments have only been made of the amount of ore which may have been processed on a limited number of ironworking sites, namely those on which the extent of the present-day slag deposits have been discerned either by field survey, aerial survey or excavation, or a combination of these. The ore mined and then processed on these sites is summarised thus:

ARICONIUM (1st century)	175,000 tonnes
ARICONIUM (2nd century to c.210)	300,000 tonnes
NEWENT (2nd century to c.210)	175,000 tonnes
MONMOUTH (c.AD 75 to c.210 min. estimate)	150,000 tonnes
OVERMONNOW (3rd and 4th centuries)	100,000 tonnes

Smelting in the third century on the villa sites of Chesters, Woolaston and at Pope's Hill, based on the extent of known slag spreads, may perhaps have consumed some 25,000 tonnes of ore.

If one can allow that Whitchurch and its environs originally produced a minimum of 175,000 tonnes of slag, based on excavated evidence and antiquarian observations, then the total amount of ore processed on these sites alone during the 1st to 4th centuries AD would amount to: 1,100,000 tonnes.

To this must be added the presently unassessable amount of ore smelted at Coleford and the lesser amounts smelted during the first century on 'village' sites and during the fourth century on recently discovered small close-to-Severn sites.

When considering the amount of ore mined one has to look further than what may have been smelted in and around Dean. There is some evidence that Dean ores were shipped from a Severn port upstream to Worcester, down river to Gatcombe and across river to Frocester (for a fuller discussion see 19. The Distribution of Crude Ore). At the moment the known extent of distribution of crude ores is scant and the amount incalculable. Clarification will take a long time and is dependent on excavators analysing and publishing ore samples found on sites away from Dean.

## 16. THE EXPLOITATION OF DEAN'S TIMBER

Dr. Cyril Hart OBE, for many years H.M. Senior Verderer in the Forest of Dean and the author of a number of authoritative books on Silviculture and Woodland Produce recorded the following information about charcoal burning using traditional methods: '....it is clear that in general the method of making charcoal (little changed from time immemorial) was as follows. A dome-shaped stack was made of billets of wood from small trees or branchwood of hardwoods (not conifers). It was covered with sods and earth, and a few inlet flues (mere holes) were left at ground level, with one outlet flue at the top. Skill was needed to build a stack which would char well and evenly without collapsing, and to start the fire down in the heart of it. After the fire had got under way, and the wood near the core had been burned and to some extent destroyed, the inlet flues were gradually closed. The remaining wood then received insufficient air for its complete combustion, but sufficient heat remained to force out the volatile matter as gases, leaving the carbon content behind.

The charcoal burners lived a lonely life, because they could not leave their work by day or night. The process took several days to complete and continually the charcoal-burner had to stay beside his stack, watching it every few hours in fear that a sudden collapse of its earthen covering might admit too much air and so cause the whole stack to be destroyed, or to have to be laboriously rebuilt.

Stopping the process was even more tricky than starting it off. Any sudden inrush of air before the stack was quite cold would cause the whole to catch fire. First the slow fire had to be extinguished by closing all the flues, which was done soon after a change in the colour of the smoke from white to blue indicated to the charcoal-burner that the right stage had been reached. The stack was allowed to cool off for two or three days, being watched the while, whilst the burner filled in the time by building his next stack. Then it was opened, somewhat hopefully, and if it had cooled sufficiently, it was unplied. As a rule, water was added to ensure safe cooling. Thereafter it was a question of separating the 'brunts' (partly burned ends of billets) from the charcoal, and grading and bagging the latter' (Hart C. 1971).

It required selective cutting from one acre of forest to produce a single stack. The whole process from cutting to bagging took nine man days (ibid.p.325. Info. from PRO E101/140,20).

Roger Jones, of Soudley, is one of a handful of people now in the Forest of Dean with the skills to produce charcoal using traditional methods, which skills he frequently demonstrates although not for commercial purposes. His information is that an ideal size stack was 20 feet (7m) in diameter and built to a height of 6 feet 6 inches, (2m) including the covering turfs and soil. It consisted of about 5 tonnes of timber which yielded 1 tonne of charcoal. The ratio of wood to charcoal in a successful stack was always 5:1. Thus five tonnes of timber was gathered from an acre of land on average (Pers. Comm. with R.Jones on 24.8.1991).

In 1282 it was recorded that 2,292 charcoal hearths were still visible in Dean's woodlands, some in use, some abandoned (Hart C. 1987. Info. from PRO E.32/30 m 18, no.1623).

Brian Johns, currently researching charcoal hearths, suggests that raked-out charcoal pits average 28 feet (8.5m) diameter which agrees well with the original stack construction being of 20 feet diameter



(Pers. Comm. B.Johns 24.8.1991). When cut into a steep slope their diameter would be less but the stack may have been higher (also see Johns B. 1989).

With the foregoing information to hand it ought to be possible to produce some informative estimates of the impact on Dean's woodlands of more than 300 years of Roman iron-working. In fact, due to the widely varying results from modern experimental smelting and smithing of iron in prehistoric and Roman-type furnaces, any estimates would be highly speculative.

Charcoal was used by ancient iron-workers not just in the smelting stage, where it was essential, but also in the primary and secondary smithing stages to the point where a forgeable bar of iron was produced. Charcoal was even used by the forgers of artefacts although coal could have been utilised at this stage. Slag and waste produced during the smithing stages is discernibly different from that produced during smelting and is also of lesser quantity, however the smithing stages consumed an enormous amount of charcoal due to the need for frequent re-heating to release entrapped slag from the bloom.

Most of P.Crew's experiments have resulted in a bloom of between 40% and 50% of the ore smelted, however there was still a variable proportion of entrapped slag which had to be released in the primary smithing stage and the actual iron yield was much lower. The first stage, from bloom to billet, as Crew observed: '... is very slow and requires great patience, taking up to four hours and many re-heats.'

He highlights the problems of determining just how much charcoal needs to be used from the ore-smelting stage to finished artefact thus: 'There have been few attempts to quantify the full cycle of early iron production. A great deal has been said about the experimental smelting of iron, but the problems of smithing have been glossed over..... Tylecote's experimental work gave a charcoal to bloom weight ratio, for his 1:1 (fuel:ore) smelts, of between 7:1 and 15:1. This does not include, however, the charcoal for preheating..... Tylecote's only

comment on the smithing requirement is that 'an allowance made for reworking the blooms into forged bars would double the ratio'.'

Crew then draws attentions to experiments by Dr.H.Cleere who, in his most successful trial produced a bloom of 9kg from 90kg of ore and using 120kg of charcoal which gives a charcoal to bloom ratio of 13:1. He also pointed out that Cleere's and other experiments were based on smelting in a Roman-type slag-tapping furnace whereas his own experiments, referred to above, were more applicable to prehistoric technology. Nevertheless, his experiments also indicated a charcoal to bloom ratio of about 13:1 to 15:1. The staggering amount of charcoal used by Crew to smith the bloom into a forgeable bar of iron was summarised thus: 'In conclusion, it seems that one kilogram of fully smithed bar iron, produced from bog ore in a low shaft furnace, would have needed about 100kg of charcoal', a ratio of 100:1 (Crew P. 1991, Cleere H. 1970, Tylecote RF 1971).

So, although there is general agreement that a charcoal to bloom ratio of around 13:1 is an acceptable average, the amount of charcoal needed to smith the bloom into a usable bar of iron is still open to conjecture and would make any estimate of the amount of charcoal produced during the Roman period from Dean's woodlands too speculative to be of any value.

What may be observed here is that, if coppicing was practiced in and around Dean, as seems likely, it would have taken around 15 years of growth before the coppiced trees could be cut to produce charcoal suitable for smelting, in other words, once an acre of woodland or scrubland had been cleared it would be around 15 years before it could be cleared again to make another stack.

Charcoal-burning ostensibly took only the smaller, inferior trees, coppiced trees and 'lop and top' from medium trees, however when demand for charcoal was high it was not unusual for mature, larger trees to be de-branched 'well-nigh unto the top' which would not be in the interests of woodland conservation (Hart C. *ibid.* 326-327).

We are, of course, looking at a much wider area than just the Dean woodlands for sources of charcoal. Newent could have obtained much of its supply from wood and scrubland closer at hand. Monmouth and the south Herefordshire sites would have obtained much of theirs from west of the Wye. Nevertheless, by the beginning of the third century it would be a fair guess that parts of the central woodlands had been reduced substantially, however, a major section of the Forest would reasonably have been reserved for hunting by the wealthy. It would have been a rich hunting ground with deer and wild boar heavily populating the reduced tree cover. Lesser demands during the third and fourth century would have allowed for some regeneration and by the end of the fifth century it is possible that the Forest had been restored to what it had been half a millennium before. It remained thus for another half millennium until it became a Royal Forest of the Norman kings.

## 17. MANPOWER AND THE IRON INDUSTRY

### 17.1 THE ORE SMELTING INDUSTRY

It would require a team of men for smelting and primary smithing operations. If we leave out the need for roasting local ores, the ore would still need to be crushed into serviceable pieces. Each group of furnaces would probably have had its own ore dump and charcoal store which would have needed regular replenishment.

It is reasonable to allow for transporters being directed to dump their ore and charcoal conveniently for each furnace group rather than in a central depot. Part or all of each furnace in a group would probably need to be repaired after each smelt. Clay would need to be handy for this, and water to make it workable. Each furnace would need to be pre-heated for the first smelt of the day. Bellows operators would be needed to maintain a consistent draught.

No records survive of manning requirements for the Roman period but there is a local record for iron smelting in the late bloomery period. In 1531 men from Dean were smelting ore at the king's forge at Llantrisant, Glamorgan: 'Five men kept the fire to melt the ore, having 12d a day each after the manner of the Forest of Dean. Four others worked at the bellows, whereof three blow at a time and one of them stands void to refresh the others for he bloweth 6 or 7 hours at every gadde that is melting, and thus they make two gaddes a day each weighing 1 cwt.'..... 'it was said that 3 cwt of (ore) would make a gad of 1 cwt or more' (Hart C. 1971 and 1966).

Late medieval production had improved somewhat on that of the Roman period but the methods were still basically the same. They were producing around 35-40lbs of iron for every 112lbs of ore but their production of around 112lbs of iron (51 Kg) from each smelt was probably much higher than produced during the Roman period. Their charcoal use would also have been higher, but no information was recorded concerning the charcoal to iron ratio. The use of three bellows is also more than is attested from the Roman period. The manpower requirement for this medieval furnace was thus higher, however it offers a guide.

On the basis of his experiments Cleere proposed that a three-man team could operate a Roman-type shaft furnace without undue fatigue (Cleere H. 1976). Crew's experiments indicated that a three-man team of one smelter/smith and two bellows operators/assistants is the minimum number of operators required, but that did not include the effort required to collect and roast the ore and to collect the wood and make the charcoal (Crew P. 1991).

Excavated ironworking sites in this region have revealed furnaces in clusters. In all probability several were in simultaneous operation but this has not yet been conclusively proved by excavation. In view of the huge amounts of ore smelted at Ariconium and Newent during the second century it is difficult to see how this could have been accomplished without simultaneous smelting by a number of furnaces.

## 17.2 THE ORE-MINING INDUSTRY

There is no documentary evidence with which an assessment can be made for the manpower requirements of ore mining. Records of the daily production for 19th century iron mining are of little value, for mining underground was not comparable to outcrop mining in the Roman period which had to be done by pick and shovel without the need for deep tunnelling, and possibly without the frequent flooding problems that troubled the deep miners.

There is no real basis for calculating how much ore could be 'picked' out by one miner in one day. Much would depend on the strata being mined and the richness of the vein. That upwards of 800,000 tonnes of crude ore were probably raised in the second century alone would mean a weekly average of more than 150 tonnes were mined.

## 17.3 THE CHARCOAL INDUSTRY

For all the aforementioned reasons it would be unwise to attempt an estimate as to the number of charcoal-burners employed to fuel the iron industry. What may be determined from those involved in 20th century charcoal-burning, using primitive methods, is that one man, under pressure, could probably construct four stacks, burn them, cool them, rake them and bag the charcoal in two weeks, allowing seven days for each stack to burn and cool. One stack would need to have been constructed over each of the first four days. After the two weeks he would have to move to another convenient source of timber. It is a reasonable assumption that two men would have worked in some proximity so that they could take turns in sleeping while the other kept the stacks under surveillance.

## 17.4 TRANSPORTATION AND THE IRON INDUSTRY

Contrary to the situation in the Weald where ore was smelted close to where it was mined, Dean ores had to be transported to the major iron producing sites. Of all the attested smelting sites only Coleford was close to an ore source. At the moment there is insufficient evidence to confirm whether ore was transported as crude ore or crushed ore. At Chesters, Woolaston it was crushed at the villa site, however, a residual dump of crushed ore at High Nash, Coleford might suggest that sometimes it was crushed before transportation to the smelting site.

Charcoal too would have required transportation but not necessarily as far as the ores.

## 18. TRANSPORTATION AND COMMUNICATION

### 18.1 AVAILABLE METHODS

Pack-horses, mules, donkeys and oxen were the animals which could be utilised for carrying and pulling loads. Two-wheeled carts and four-wheeled wagons are depicted on Trajan's column in military use but the wagons are rare and the two-wheeled cart would almost certainly have been preferred for local carting around Dean but only where there were well made-up roads. Elsewhere pack animals would have been preferred. Where carts were used mules or oxen in fours would have pulled the load. The following table indicates the load that could be carried and the performance of each type of animal. It is compiled from ANIMAL MANAGEMENT, 1901, prepared in the Veterinary Department for the General Staff, The War Office (Reprinted 1914) in Peddie J. 1987):

	Pack Horse	Mules	Donkeys	Oxen
LOADS (lbs)	160	160	160	160
SPEED (mph)	3 to 4	3 to 4	2½	2½
DISTANCE Miles per day	20-25	20-25	15	15-20

Teams of four mules or oxen could have carried a load of around 1500lbs on a two-wheeled cart.

Translated into metric terms the 160lb load = 72.6 Kg.

The 1500lb cart-load = 680 Kg.

A load of half a tonne would have been easily transported by one cart or seven pack-carrying animals.

WATER BORNE TRANSPORTATION assessment is more of a problem. A very limited amount is known about boats of the period, river water levels have risen since Roman times, weirs have been introduced, sections have been canalised, rock-bars and fords have been excavated or dredged out and Severn estuary channels are constantly moving.

THE RIVER SEVERN - Prior to 1842 when part of the river was canalised between Gloucester and Stourport 'much trade was carried on by Severn trows and barges over this stretch and far beyond - up to Pool Quay, some four miles below Welshpool in Montgomeryshire' (Richardson L. 1964). The Severn was tidal as far as Upton, upstream of Gloucester, but beyond that laden or part-laden boats would be dependent on 'fresnes' (a river rise due to heavy rain at the Severn source in mid-Wales). It is on record that in 1796 'there were not two months in the whole year in which barges could be navigated' due to low water. With favourable conditions and travelling downstream boats from Welshpool could reach Gloucester in one long day or, at most, by the second day (ibid.4). Going back upstream was another matter.

Thomas Telford wrote in 1800 ('Some account of the Inland Navigation of the County of Salop') 'The navigation of the Severn is very much impeded by the lowness of water in summer and by floods in winter..... The vessels chiefly used on it are barges, trows, wherries and boats. The barges and trows have masts..... The stream carries them down, with or without sail, and they are towed up by men, assisted or not, in the same manner, according to the wind. The barges are from 20 to 80 tons burden, and trade very much between Shrewsbury and Gloucester. The trows are larger..... They fetch timber from Pool Quay in Montgomeryshire' (ibid.13-14).

In assessing the archaeological and geological data they had gathered from their Severn estuary investigations Allen and Fulford proposed that 'The sort of narrow deep channel now restricted to within 10 Km of Gloucester could nonetheless have ranged further down the Roman estuary....' and 'The estuary may not have changed in general aspect since the Roman period, but there are several hints that, under the impetus of a rising sea level, it is advancing up the Severn Vale, and therefore in the area we are considering may have been more suitable in Roman times for small craft' (Allen JRL & Fulford MG, 1987).

Recent excavations on and near the Roman waterfront at Quay Street, Gloucester confirmed aspects of earlier excavations and further increased knowledge of the Roman period use of the Severn for docks/wharves. M. Atkin, director of the excavations observed in his interim report (Atkin M. 1989): 'There has been a considerable rise in the water-table since the Roman period and a correspondingly dramatic movement of the waterfront. The present ground water level is at c8.9m AOD, 2m above the earliest Roman features recorded at the Co-Op site. Charles Green first interpreted the remains discovered on the site in 1938 as being part of a curved foreshore within a creek exiting to the River Severn. The 1989 trial excavation appears to confirm this hypothesis, suggesting that the site lay within a shallow basin..... with a beaching place..... The Period 1B silting over the site suggests that the Romans quickly had difficulty in maintaining this waterfront. .... Rowbottom has asserted that 'it is certain that any



attempted harbour, basin, creek or indentation opening off the tidal Severn will silt up as fast as it can be dug'. Continued problems with silting and the need for a deeper harbour may have then prompted a movement of the wharf onto the main channel of the River Severn. It may have been at this stage that the quay wall recorded in 1846, 1973 and 1974 was constructed.'

Whatever the initial problems they were largely overcome and Gloucester became a key port and distribution centre during the Roman period.

THE RIVER WYE which flows into the Severn estuary at Chepstow is tidal as far as Tintern (15 Km by river from Chepstow) which is in river distance halfway to Monmouth. A few kilometres beyond Monmouth, rapids beneath the Doward make navigation impractical unless loads were lifted from one boat to another. Between Symonds Yat and Ross-on-Wye huge loops in the river add considerable distance to a journey. The same applies between Ross and the site of Kenchester. It would certainly be possible to take loads upstream from Dean but, as with the upper reaches of the Severn, a good head of water would be necessary even for flat-bottomed boats and the towing distance would be twice what it would be by road (See Stevens BJ. 1965).

Two types of boat that are attested from historical sources for what may be termed 'this region' are the flat bottomed boats or lighters which could be towed upstream on such as the River Leadon between Gloucester and the Newent area, and the curragh, a lightly built boat of Celtic origin. Julius Caesar caused similar craft to be constructed during a Spanish campaign c.49 BC. 'Caesar ordered his men to build boats of the type that his experience in Britain a few years before had taught him to make. The keels and ribs were of light wood; the rest of the hulk was made of woven withies and covered with hides. When the boats were finished, he had them conveyed by night, on wagons joined together, some twenty-two miles from the camp. He conveyed his men across the river in these boats, and so captured unexpectedly a hill adjoining the bank and fortified it before his opponents realised

what he was doing. He then transferred a legion here.....'(Caesar: The Civil War 1.54).

'These boats were frequently 24 feet long but they could, without difficulty, have been built larger than this. Tim Severin sailed a 36 feet long curragh across the North Atlantic in 1976' (Peddie J. 1987). Peddie describes an experiment in their use and suggests that at least six people would be needed at the oars to make headway upstream against a tide of c.1.3 knots without the assistance of sail.

Diocletian's Price Edict of AD 301 is sometimes quoted to prove that transportation by water was more economical than transporting by land. Peddie used it to show that: '... a 1200 pound wagon load of grain would double in price after a road journey of 300 miles: shipping the grain the length of the Mediterranean was cheaper than taking it 75 miles by road.' His conclusion was that: 'Land transport was both economically and administratively expensive unless a generous proportion of river traffic could be utilised' (ibid 157). Common-sense dictates against the arbitrary application of these statistics. Much depends on the product to be transported, its bulk, weight and quantity, the distance over which it must be conveyed, the quality of roads, the directness of rivers, the winds, the tides and above all for the Dean region, what the weather was doing above Plynlimon in mid-Wales, the source of both the Severn and the Wye. It is also important to remember when considering local river transport that 'what goes down must come up'. A boat heavily laden with say iron bars could travel rapidly downstream providing estuary tides were utilised carefully. Returning empty would probably not be considered economically sound. Laden with a return cargo, especially if towing was necessary, would be excruciatingly slow and laborious. Over short distances a more direct, well-made-up road with pack-animal teams moving at a consistent speed might well be a preferred choice.

It could, of course, be argued that pack animals would also have to return empty, however, this might not necessarily be the case. Whereas river craft would have to return along the same route the road systems

and trackways would enable animal drovers to negotiate return loads that might take them along circuitous routes to make deliveries to off-river settlements before heading for base.

Coracles, as a means of river transportation, should not be overlooked. A 56lb/25kg load is quite possible and they have the advantage of being portable for the return journey.

## 18.2 WYE/DEAN'S ROADS AND PORTS IN ROMAN TIMES

Roads and ports are closely linked. Every port, or wharf, must have good road links over which goods may be moved in and out. Every production site must have good road links to distribution centres or ports. Every distribution centre must have good road and/or waterway links to the consumer markets. Only by taking these facts on board will it be possible to suggest the method of transportation and communication used for various production centres in Dean and the Wye Valley.

ARICONIUM, the largest production centre for around 160 years, is about 5 Km away from the Wye at Ross with a direct road connection over reasonably level ground, however, the loops and rapids between Ross and Monmouth make it unlikely that it was a regularly used product dispersion route. By road to Gloucester port is  $12\frac{1}{2}$  miles (20 Km) but whichever route is taken, either Margary's routes 611 and 61 or 614 and 61, there are hilly areas to cross with some steep gradients before the final level stretch into Gloucester. The alternative route would have been via the Dean Road (route 614) which passes on reasonably level ground without steep gradients to the east of the Forest of Dean. Newnham-on-Severn is  $7\frac{1}{2}$  miles (12Km) from Ariconium via a link road to Littledean, and is well downstream of Gloucester. Lydney harbour is 13 miles (21 Km) from Ariconium at the southern end of the Dean road, but it is also 23 miles (37 Km) downstream of Gloucester docks and actually on the Severn estuary where it is more than one Km wide. Logically, if Ariconium iron was to be transported either upstream of Gloucester or eastwards into the

Cotswolds then it would have gone by road to Gloucester for re-distribution. If the iron was to be shipped across from, or downstream from Lydney then the well-made, paved, kerbed and revetted Dean Road would have been used. There was virtually no difference in road distance to Ariconium from Lydney or Gloucester. It was Sir John Wintour's preferred route to move timber from Lea Bailey (3 Km from Ariconium) to Lydney as inferred by Samuel Pepys in his diary for 20th June 1662. Wintour would have found it necessary to carry out repairs to the road surface (Pepys S. Edition of 1952).

During the 1st century when most of Ariconium's iron production was being moved westwards for military use transportation by road would have been essential either through Monmouth using Margary's route 612a or a road not listed by Margary crossing the Wye at Ross and proceeding via Whitchurch to Monmouth, or else by route 613 to connect with the main N - S route, 6a and 6c. Transportation to forts along the South Wales coast could well have been along the Dean Road and by river from Lydney.

MONMOUTH was the second largest production centre, an important port on the Wye and with major roads to all points of the compass. The Wye would, with logical certainty, have been the preferred route to Chepstow and the Severn estuary. The land route, Margary road 6d, climbs steeply out of Monmouth and has an east - west valley to negotiate in zig-zag fashion west of Tintern. It holds to the high ground for most of the way and connects with route 60a just west of Chepstow. It would appear to have been a pre-Flavian route when Sudbrook was a key landing and supply base after c.AD 50 but would have lost much of its importance in the Flavian period and was probably only used for transportation when the Wye was un-navigable due to drought or floods.

DEAN'S ROMAN ROAD SYSTEM in most instances made use of existing pre-Roman trackways which were upgraded by paving them. The so-called Dean Road is an example of this. It linked Iron Age sites at Lydney, Soudley, Welshbury and Ariconium. Its upgrading was probably early,

c.AD 50, and essential to the earliest phases of campaigns against Caratacus, linking the Gloucester to Mitcheldean road to the Severn and Ariconium. From Littledean a 2 Km long spur road led to the river crossing at Newnham-on-Severn and Margary's route 543 to the Fosse Way. Newnham may well have served as a small port in the Roman period as it did in more recent years (Hart C.1971).

From Blackpool Bridge, 2 Km south of Soudley, another paved spur road connected to the important coastal route (No.60a) at Nibley, just south west of Blakeney and probably continued on to the Severn at Gatcombe and Purton, both confirmed as harbours in later years (ibid.393). Both the Dean Road and the Blakeney spur road were still in use around 1680 when the Crown requested information on the state of and cost to repair Forest roads including the availability of stone for 'stoning' them. The Bond papers record: 'The road from Mitcheldean to Littledean all forest is two miles requiring a great deal of labour & a pretty many stones, stones convenient.... £90.'

'The road from Littledean to Blakeney and Lidney 4 miles forest, labour, some stones, about.... £30' (Bond Papers, Gloucestershire Record Office D2026 X23).

Following the initial military use of the road it continued as an important distribution route for iron from Ariconium into the third century. As a possible 'pilgrim' route in the fourth century it also linked the temple sites at Lydney and Littledean.

Coleford, as the main iron-working settlement within the Forest, had to have excellent road links. The main north - south road ran parallel to the major ore outcrops between Coleford and Lydney where it joined route 60a, a distance of five miles (8 Km). Branch roads connected to the Wye at Redbrook and Bigsweir but the main westerly link was to Monmouth. In an easterly direction there was a cross-Forest road across Cinder Ford to Littledean and the Dean Road. To the north there was a short link to the other cross-Forest route of prehistoric origin running from Mitcheldean via Drybrook, Ruardean, Lower Lydbrook,

English Bicknor and Staunton to Monmouth. Paving and kerbing has been recorded along sections of all of these roads. Another probable route across the Forest ran from the Dean Road near Oldcroft through Yorkley and Parkend towards Coleford. A large Roman coin hoard was discovered at Parkend (see West Dean CP) and a single coin of Constantine I (Urbs Roma type) was found on a section of paved track between Parkend and Yorkley. Many other well-surfaced tracks must have existed in the Forest to allow for easy removal of stone and for access to hunting lodges.

#### LYDNEY - THE KEY FOREST PORT ?

One fact has now clearly emerged - Lydney should, by all the road evidence, have been the key trading port for Dean during the Roman period and yet until now there is no archaeological confirmation of this although the circumstantial evidence is considerable.

The proximity of Park Farm villa and the Lydney temple site demands that a harbour must have been there. One would have expected the Lydney Iron Age hill-fort to have had harbour facilities. The Roman roads from Coleford and Ariconium join the Newnham to Caerleon road at Lydney. Lydney has an inlet or pill into which flow two major streams before joining the Severn. In the 1282 'Regard of the Forest of Dene' more boats were recorded as based at Lydney than for any other port in Dean. In more recent years it was an important harbour and the Admiralty built ships there in the 1650s.

Daniel Furzer, a hired master shipwright informed Pepys in 1664 that Lydney 'is not so fit a place now for building a ship as formerly, on account of the growing of the sands, not known in man's memory before' (Calendar. State Papers Domestic 29/94,100). See also Harris FH. 1945 'Lydney Ships'.

Canalisation and development may have destroyed much of the evidence but it is also true that Lydney is under-investigated

archaeologically.

Until proof is forthcoming it will have to be assumed that Lydney was the main Severn port, south of Gloucester, from which ore and iron was exported, as well as stone and other tradeable items. This would also imply a depot there for temporary storage.

#### 19. THE DISTRIBUTION OF CRUDE ORE

Until recently there has been little convincing evidence that crude ores were shipped away from Dean to be smelted elsewhere. In the Weald they were always smelted close to the ore source and it was the iron blooms and forged artefacts that were shipped far away.

As we have already seen it was the usual practice in Dean to move the ores some distance to the major smelting sites and that smelting sites adjacent to the ore source are extremely rare.

Allen and Fulford observed following their researches along the Severn estuary: 'Our estuarine sites, along with Worcester, can be seen as part of a more widespread practice of exporting the ores away from the ore-bearing formations to be smelted elsewhere.'

Clearly the Severn and Wye played a major role in the distribution of ore away from the producing area. Ironmaking at Worcester, so far the most remote site from the source of ore, is regarded as a major occupation of the settlement in the Romano-British period. Here the relative high alumina content of the slags suggests that rich ores imported from Dean may have been blended with leaner ores from nearer sources..... We can now suggest a very different tradition to that of the Weald, where quarrying and smelting appear to have occupied the same sites, but over a much larger territory. It was probably the high quality of the Dean ores - the Wealden ores are lean - which lead to their wide dispersal away from their restricted outcrop sources' (Allen JRL & Fulford MG. 1987). Excavations in Worcester during

1985/86 produced a well-stratified sample of red hematite 'indistinguishable from ores found in the Forest of Dean.' (ibid. p.279).

At the Gatcombe Romano-British villa estate, downriver from Dean and close to the port of Abona, a Phase II building (2nd cent.) contained an ore sample identified by R.F.Tylecote as: 'Heavy, non-magnetic iron ore of very good quality, probably from the Forest of Dean. It has probably been heated or roasted.' The latter comment is the first evidence of Dean ores possibly being roasted before smelting. A Phase I building also contained: 'Heavy tap slag with high iron content; a product of iron smelting' (Tylecote RF in Branigan K. 1977).

Forest of Dean ores have also been found on the Frocester villa site which is 12 Km inland from the Severn estuary, opposite Lydney (Pers. Comm. E.Price).

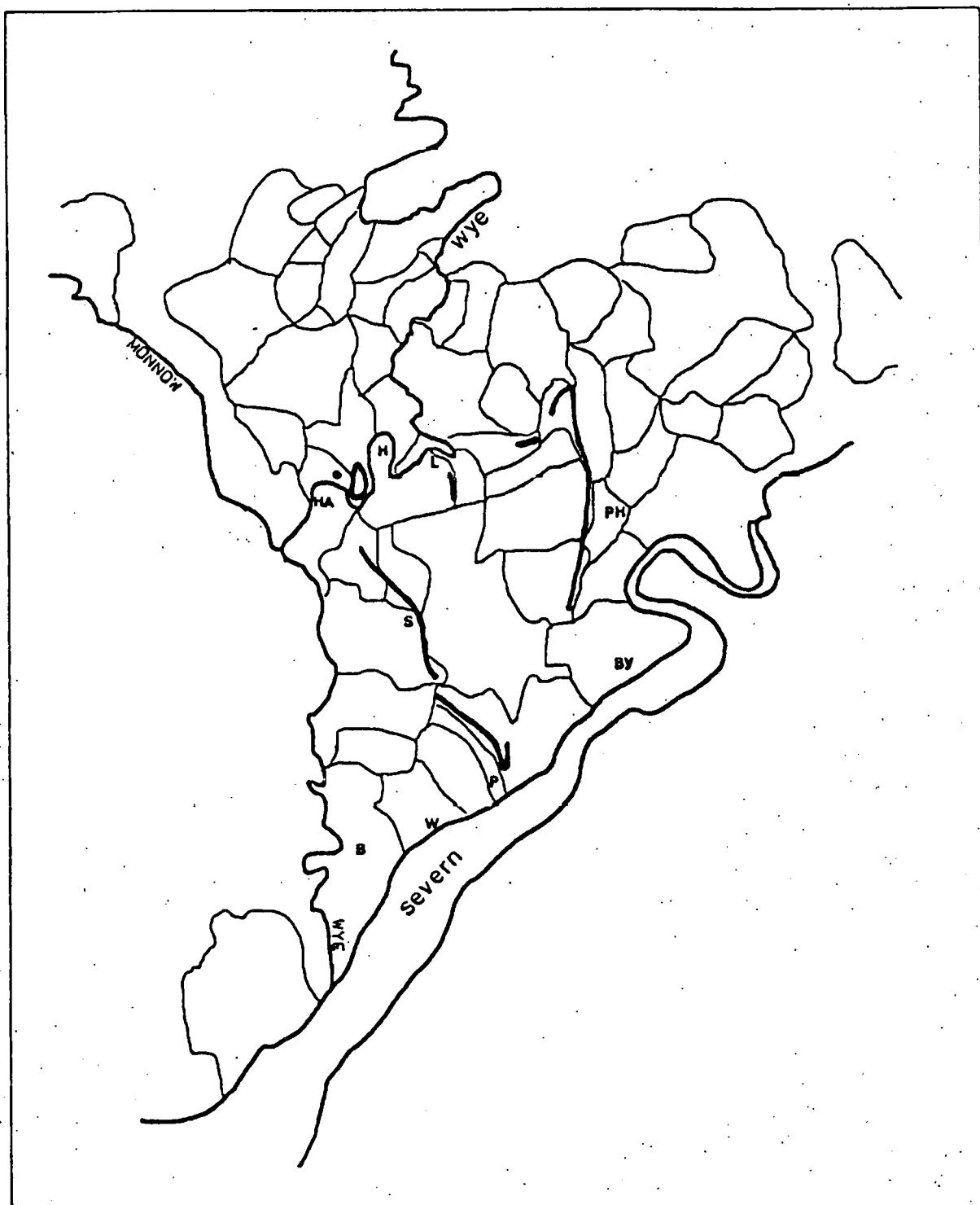
Allen and Fulford also identified Forest of Dean ores at several east bank Romano-British sites along with tap-slugs. They range down-stream from Gloucester for several kilometres (ibid.pp.249-251 and 1990). The utilisation of these ores, based on pottery finds, would appear to be mainly mid-3rd and 4th centuries and Lydney would be the obvious port from which they crossed the Severn.

Ores were still being shipped in 1282. 'At Aylburton is a port called la Were, and boats call there for iron ore' (The Regard of the Forest of Dean, 1282, Hart C.1987).

### 19.1 DISTRIBUTION FROM VILLA SITES

It is unlikely that any crude ore was distributed through wharves associated with villa sites, however some were apparently involved in the distribution of smithed blooms in the later third and possibly the 4th centuries. Chesters, Woolaston is an obvious candidate. The adjacent Ley Pill provided a suitable wharf for loading and the amount of slag lying around the site suggests that the villa ore-smiths





# RELATIONSHIP OF HIGH STATUS RESIDENCES TO ORE OUTCROPS

B = Boughspring      W = Chesters, Woolaston      P = Park Farm  
 BY = Blakeney      S = Stock Farm      PH = Popes Hill      L = Lydbrook  
 H = Huntsham      HA = Hadnock  
 Ore Outcrops = —————

smelted in excess to the local requirements. The same could be said for the Hadnock villa but here the blooms were probably only shipped a short distance downstream to Monmouth for re-working or re-distribution. Smithed blooms from Popes Hill could have been conveniently taken to either Newnham or Lydney by road. The nature and amount of iron-working undertaken at the Park Farm villa is unknown but anything in excess of local requirements would have been distributed through the Lydney docks a few hundred metres away.

In summary, on present evidence it would appear that Gloucester, Lydney and Monmouth were independent shipping centres and operating as such for most of the Roman occupation period. To what extent Lydney was used for trading other than ore and iron will only be known as a result of further archaeological investigation in the town. Only Gloucester has produced evidence for possible warehouses which, one would presume, would be essential for general trading.

## 20. ADMINISTRATION OF THE IRON INDUSTRY

Without any epigraphic evidence whatsoever, not even an incomplete inscription and Classis Britannica stamped tiles which Henry Cleere had to draw on when assessing the administration of the Wealden industry, any observations concerning the Dean iron industry must be viewed as speculative and based on circumstantial evidence only.

First there is a need to summarise what is known from other iron-producing Roman provinces. I will not repeat what Dr. Cleere has presented so ably in Cleere H. 1975 and 1981 concerning continental sites and the Weald, however, something must be said about Imperial policy.

Lewis and Reinhold summarised the situation thus

'Most mines were government property..... Like the imperial estates, the mining districts were placed under the control of resident

procurators, each of whom issued his own local rules to implement general imperial policies. The mining villages were usually not organized along municipal lines; instead, the procurator, like his counterpart on a landed estate, personally exercised the administrative and judicial authority in the village and district,..... The emperors (notably Hadrian) encouraged small entrepreneurs by offering those who put unopened or abandoned mines into operation much the same conditions and privileges as were extended to estate tenants who expanded the cultivated area: the mine holding, too, was contingent upon uninterrupted operation; the fisc received a one-half share of the output; the operator was even called COLONUS (as well as 'proprietor' or 'occupier'); in addition, these operators even had the right to sell their holdings under certain conditions' (Lewis N & Reinhold M. 1966).

Although at this stage appearing apparently unrelated to the subject under discussion it seems pertinent to present a picture of imperial estates and agrarian policy summarised again by Lewis & Reinhold thus:

'By far the biggest landowner in the Roman Empire was the emperor. As princeps he possessed estates all over the Empire, some inherited from various local dynasties on their extinction, others bequeathed by or confiscated from private owners. Each estate was operated under the supervision of a resident imperial procurator, who carried out the general policies laid down by the emperors within the framework of local conditions and traditions. We are best informed about the estates in Africa and Egypt, the two major sources of Rome's food supply. The general procedure in these provinces was to lease parcels of the estate to tenant farmers (coloni) for varying periods..... In some places the procurators leased large tracts to lessees-in-chief (conductores), who cultivated part themselves and sublet the rest to coloni..... The Roman emperors attempted to create a solid and stable class of tenant farmers.... As time passed and the coloni handed on their holdings to their heirs, both the holding and the 'owner's' status came to be regarded as hereditary....' (ibid.).

If the map is consulted that combines the villa sites with the ore outcrops it will be observed that no villa is located within the roughly circular outcrop area which also contains within itself the main Forest area and the coal resources. One villa only is close to the mines, the one at Stock Farm, Clearwell. All of the others are on the perimeter of Dean and close to the Wye, the Severn and either agricultural lands or fisheries.

Only one mining settlement lies just within the circle, at Coleford. No other settlement was permitted within the central woodlands area from soon after AD 75 until the end of the Roman period. Neither was iron-smelting allowed within the central woodlands. Ore had to be transported to ironworking settlements further afield

Ariconium and Blestium, although, one assumes, possessing guest-houses/inns, were also primarily iron-working settlements and not towns. Likewise Newent. There is a total absence of any large urban centre for the region during the Roman period.

All of the key resources, including the greenish sandstone which was used in towns and on villa sites more than 75 miles distant from Dean for roof tiles and flooring, lie within the central area.

In 10.6 'A Change of Administration in the Flavian Period', attention was drawn to the high status residence constructed at Blakeney c.AD 75 and the proposal by the excavator that: 'The most likely context for the building here is an early administration centre for a high-ranking official, possibly appointed to supervise mining and other economically viable industries in the Forest area.'

Earlier, in 10.1 and 10.2 the pre-Flavian military presence associated with early ironworking at Ariconium was discussed.

Early in the Hadrianic period, c.AD 120, some significant developments began to take place in and around Dean. The instant high status villa was constructed at Woolaston, more modest villas appeared at

Boughspring, Park Farm, Hadnock, Huntsham and probably Popes Hill. A similar structure was built at Ariconium. For the first time a modest villa was attached to a mining area at Stock Farm. At Newent a whole new industrial settlement was established. Iron production expanded everywhere to staggering proportions. Around that time the original high status building at Blakeney fell into ruin.

The developments invite speculation. To what extent were the resources of Dean taken into State control ? Were there administrative officials at Blakeney and was their residence moved to a more central, more salubrious position at Woolaston overlooking the Severn ? Was a manager placed in charge of shipping from Lydney and resident at Park Farm ? Were other managers placed at Stock Farm and Popes Hill to control the mines on the west and east sides of the Forest ? Were others placed in charge of production at the Ariconium and Monmouth iron-working centres, the latter residing at Hadnock ? Were tenant farmers placed at Boughspring to farm the Bearse and at Huntsham to farm the peninsula ? Was permission given to an entrepreneur to establish a new settlement at Newent providing he drew ore from the State controlled mines and maybe paid a half-share of the output to the State ?

Around the time that Britain was split into four provinces and Dean became part of Britannia Prima, in the early 4th century, and when a whole new bureaucracy was formed to administer Britain the villa at Woolaston was deserted for a period, then reconstructed, but the baths, at least, were not restored to their former glory although being more than adequate. Could this mean that a Dean-based official was no longer considered a necessity under the new administration ? Had the third century decline caused an earlier administrator to close the satellite industries ? Had another sought to stimulate trade by using the Woolaston villa as a smelting and shipping point ?

Future excavations and research should provide answers to some of these questions. Meanwhile, no doubt, some may see in the information gathered for this study a considerable amount of circumstantial

evidence which may point to the Forest of Dean being an Imperial Estate. That is a subject for an entirely separate paper.

## 21. SUMMARY OF THE EVIDENCE

### FIRST CENTURY TO c.AD 50

Although excavations at Lydney Park demonstrated the presence of at least a later Iron Age community they did not prove pre-Roman ironworking. The same can be said for Coleford where a late La Tène warrior burial was excavated but ironworking was not proved at the local settlement. The bloomery slag layers within Symonds Yat hill-fort are more likely to be early Roman. Sudbrook Camp, outside of Dean, contained pre-Roman ironworking slags. Only at the Bury Hill settlement near Weston-under-Penyard, the Roman Ariconium, is there sufficient evidence to confidently assert the presence of a substantial and thriving pre-Roman ironworking community.

### FIRST CENTURY FROM c.AD 50

The pre-Flavian military fortlets 1km north of the Bury Hill settlement were certainly associated with early Roman occupation iron smelting and smithing. That the workers from the nearby settlement were drafted in at some point to operate the furnaces and forges is likely. Initially it appears to have been controlled by the military and might, for a while, have been operated by military personnel. It has also been suggested that Roman civilian operators could have moved in under cover of the military to supply them during the pre-Flavian campaigns in the west. Further excavation of the site is desirable in an effort to clarify the circumstantial evidence revealed during the 1989 exploratory excavation across four ditches. A pre-Flavian military presence has recently been confirmed at Monmouth, adding to the knowledge gained from an exploratory excavation on the

Castlefield, Kentchurch, fort site, which also had a pre-Flavian phase.

Contemporary with the early ironworking activity at Ariconium there is evidence that several small 'village' sites in north Dean were permitted to smelt iron. With no evidence for secondary smithing on these sites it is possible that the blooms they produced were directed towards Ariconium for smithing and forging. All of these sites ceased to exist in the later first century.

c.AD 75 a high status building was constructed at Blakeney. The excavator felt that its most likely residents were administrative officials with responsibilities over Dean's resources. Around the same time Monmouth was opened up as a new ironworking centre. Around Trellech and in south Herefordshire, as in Dean, a few village sites were permitted to smelt iron until the later years of the first century.

## THE SECOND CENTURY AD

There was a rapid expansion of the iron industry in the early years of the century to meet the developing civilian requirements for iron artefacts and fittings. Two new and very large furnace and smithing areas were opened up at Ariconium. A whole new industrial settlement was established at Newent, possibly an entrepreneurial initiative. Sites in south Herefordshire, peripheral to Whitchurch, appear to have been at peak production. Coleford was emerging as, apparently, the one ironworking centre in the central, uplands zone.

During the earlier years of the second century modest villas were constructed near Lydney and at Boughspring, Huntsham, Stock Farm, Ariconium, Newent, Hadnock and probably Pope's Hill. A higher status building appeared at Chesters, Woolaston.

Ore mining reached its peak and by the end of the century there is

evidence to suggest that several outcrop ore sources, including those at Wigpool, may have been exhausted.

### THE THIRD CENTURY AD

The early years witnessed a decline in the industry. There appears to have been a lessening of demand but it also seems that over-production in the later years of the second century contributed to the several closures of processing centres including those at Ariconium, Newent and in south Herefordshire. Ironworking in Monmouth was transferred to the suburbs at Overmonnow where it continued throughout the third and fourth centuries.

A new temple was constructed for the Coleford settlement workers and, from the mid-third century, there was a certain amount of ironworking on villa sites at Woolaston and Pope's Hill, and probably at others, especially Hadnock. Underground tunnel-mining has been proved to have taken place within the Lydney hill-fort in the later third century.

### THE FOURTH CENTURY AD

Overmonnow and Coleford were the two main iron-processing centres but outcrops were also mined on Hangerbury Hill and a small ironworking community smelted ores on its west-facing slopes. A number of villas were re-constructed and expanded during the middle years. No less than six coin hoards have a deposition date around the late 350s/early 360s. After the mid-fourth century an impressive new Romano-Celtic temple complex was constructed within the Iron-Age fort at Lydney Park. The temple at Dean Hall, Littledean, entered a new phase of construction so did the temple at Coleford. The last two decades of the century witnessed a rapid and terminal decline in the industry as the fabric of Romano-British society began to erode. Some villas were abandoned by the end of the century. Lydney and its temple site would



appear to be the sole focal point in Dean although further small developments are recorded at Coleford and the settlement appears to have continued into the fifth century with evidence for pottery manufacture on site.

The administration of the industries of Dean is in need of further clarification which should come with future research and excavation. Under 20. a number of distinctive features were highlighted concerning the Dean industry and developments within Dean which could provide the basic material for a paper on the administration of Dean's resources.

## BIBLIOGRAPHY

ALLEN D. 1975 In FRERE SS (Ed) 'The Origins of Coins in Britain: A Reappraisal' in: Problems of the Iron Age in Southern Britain. Institute of Archaeology, London, 97-308.

ALLEN JRL. 1986 Interpretation of some Romano-British smithing slag from Awre in Gloucestershire. Journal of the Historical Metallurgy Society, Vol.20 No.2, 97-104.

ALLEN JRL & FULFORD MG. 1987 Romano-British Settlement and Industry on the Wetlands of the Severn Estuary. The Antiquaries Journal, Vol.LXVII Part II, 237-289.

ALLEN JRL & FULFORD MG. 1990. Romano-British and later reclamation on the Severn salt marshes in the Elmore area, Gloucestershire. Trans. BGAS Vol.108, 17-32.

AMMIANUS MARCELLINUS. 1986 The Later Roman Empire AD 354-378. Trans. by Hamilton W. Penguin Classics.

ATKIN M. 1989. Excavation on Quay St. (Gloucester). Gloucester Excavation Unit, 9-11.

ATKINSON H. 1986 Excavations at Stock Farm, Clearwell. The New Regard 2, FoD LHS, 28-35.

BAGNALL-OAKLEY ME. 1881/82 On Roman Coins Found In The Forest of Dean. Trans. BGAS, 107-109.

BAGNALL-OAKLEY ME. 1894/95 Notes On A Great Hoard Of Roman Coins Found At Bishops Wood in 1895. Trans. BGAS, 430.

BELLOWS J. 1899 Proceedings Of The American Antiquarian Soc.

BICK D. 1986 The Mines and Minerals of Newent, Gloucestershire. J. Russell Soc. 1, 114-118.

BICK D. 1987 The Mines of Newent and Ross. Author. Newent, 58-67.

BICK D. 1990 Early Iron Ore Production from the Forest of Dean and District. Journal of the Hist. Met. Soc. Vol.24 No.1, 39-42.

BIELENIN K. 1974. Starozytne Gornictwo i Hutnictwo Zelaza w Gorach Swietokrzyskich. Warsaw/Cracow.

BOON G. 1960 High Woolaston Coin Hoard. Num. Chron. Vol.XX

BOON G. 1987 The Legionary Fortress at Caerleon - Isca. Roman Legionary Museum, Caerleon.

BRANIGAN K. 1977. Gatcombe - The Excavation and study of a Romano-British villa estate 1967-1976. BAR Reports 44.

BRAYLEY EW & BRITTON J. 1805 The Beauties of England & Wales, 512-514.

BRIDGEWATER NP. 1959 Ancient Buried Roads in South Herefordshire. Trans. WNFC, 218.

BRIDGEWATER NP. 1962. Trans.WNFC, 179-191.

BRIDGEWATER NP. 1964. Trans. WNFC, 88.

BRIDGEWATER NP. 1965. Trans.WNFC, 96.

BRIDGEWATER NP. 1966. Romano-British Iron Working Near Ariconium. Trans. WNFC, 124-135.

BRIDGEWATER NP. 1968. Iron Mining and Working Sites in and around the Forest of Dean. J.Hist.Met.Soc. Vol.2 No.1, 29-30.

BRIDGEWATER NP. 1969. Trans. WNFC, 447.

BRIDGEWATER NP. 1970. Trans. WNFC, 75.

BRODRIBB G & CLEERE H. 1988. The Classis Britannica Bath-House at Beauport Park, East Sussex. Britannia Vol.XIX, 217-274.

BULL Dr. 1882. Trans. WNFC, 249.

CAESAR. 1967. The Civil War trans. by Mitchell JE. Penguin.

CLARKE S. 1964. Archaeology in Wales 4. CBA Group 2.

CLARKE S. 1965. Archaeology in Wales 5. CBA Group 2.

CLARKE S. 1966. Archaeology in Wales 6. CBA Group 2.

CLARKE S. 1981. Early Iron-Working in and around Monmouth. Monmouth Archaeology No.8. MAS.

CLARKE S. 1982. Monmouth Archaeology No.9. MAS

CLARKE S. 1983. Monmouth Archaeology No.11. MAS.

CLARKE S. 1984. Monmouth Archaeology No.14. MAS

CLARKE S. 1991. Monmouth Archaeology No.19. MAS

CLEERE H. 1970. Iron Smelting Experiments in a Reconstructed Roman Furnace. Iron & Steel Inst. London, 17-19.

CLEERE H. 1971. Ironmaking in a Roman Furnace. *Britannia* 2, 203-217.

CLEERE H. 1972. The Classification of Early Iron-Smelting Furnaces. *Antiquaries Journal* 52, 8-23.

CLEERE H. 1975. The Roman Iron Industry in the Weald and its Connections with the Classis Britannica. *Arch.J.* 131 for 1974, 117-119 & 186-190.

CLEERE H. 1976 in STRONG D & BROWN D (Ed) *Roman Crafts - Ironworking*. Duckworth Press.

CLEERE H. 1976. Some Operating Parameters for Roman Ironworks. *Institute of Archaeology. Bulletin* 13, 233-246.

CLEERE H. 1981. PhD Thesis. *Institute of Archaeology, London*, 88-106.

CLEERE H. 1985 in PITTS LF & ST.JOSEPH JK. *INCHTUTHIL - The Roman Legionary Fortress Excavations 1952-65*. Alan Sutton, 289-292, 301.

CLEERE H & CROSSLEY D. 1985. *The Iron Industry of the Weald*. Leicester University Press, 46.

COLLINGWOOD RG & WRIGHT RP. 1944/45. *The Roman Inscriptions of Britain*. Oxford.

CREW P. 1986 in SCOTT BG & CLEERE H (Ed) *The Crafts of the Blacksmith. Proceedings of the 1984 Symposium of the UISPP Comite pour la Siderurgie Ancienne*, Belfast, 91-100.

CREW P. 1989. Excavations at Crawwellt West, Merioneth, 1986-89, a late prehistoric upland iron-working settlement. *Archaeology in Wales* 29. CBA Group 2, 11-16.

CREW P. 1990. Late Iron Age and Roman Iron Production in North West Wales in *Trivium* 25, St.David's University Coll. Lampeter, 150-160.

CREW P. 1991. The Experimental Production of Prehistoric Bar Iron. *J.Hist.Met.Soc.* Vol.23.No.1, 21-36.

DAVIES JL. 1990. Military Vici: Recent Research and its Significance, in *Trivium* 25, St.David's Univ. Coll. Lampeter., 65-74.

DAVIES W. 1978. *An Early Welsh Microcosm - Studies in the Llandaff Charters*. London, 29-32, 123-125.

DAVIES W. 1979. *The Llandaff Charters*, Aberystwyth.

ESMONDE CLEARY ES. 1989. The Ending of Roman Britain. Batsford, 38-40, 117-120.

FITCHETT M. 1986. Excavations at Park Farm, Lydney. The New Regard 2. FoD LHS, 24-27.

FOSBROKE TD. 1821. 'Ariconensia', 22-38.

FRERE SS. 1967. Britannia. Routledge & Kegan Paul, 220.

FRYER WH. 1886. Trans. Cardiff Naturalists Soc. Vol.18, 50-53.

FULFORD MG. 1991 Feb. Woolaston Excavations and the Chesters Villa 1990 - Summary Report. BGAS Newsletter No.28.

FULFORD MG. 1991. Woolaston Excavation and the Chesters Villa, Gloucestershire. Royal Archaeological Institute Newsletter.

GARROD AP & MOSS PA. 1967. Ariconium Excavation. Glevenis 1, GADARG - Reprinted from: 1967 West Midlands Archaeological News Sheet No.10, 6-7.

GARROD AP & MOSS PA 1967 & 1968. Ariconium Excavation: Trans. WNFC, 363.

GARROD AP & BRIDGEWATER NP, 1968. Further Excavations at Ariconium. Bulletin of Hist. Met. Group, Vol.2 No.2, 76-77.

GILLES JW. 1960. Rennfeuer in der romerzeitlichen Siedlung in Ahrweiler Wald, Stahl v.Eisen, 80:943-948.

GROVER JW. 1873. Journal of the British Archaeological Ass. 29, 121-129.

GRUNDY GB. 1935/36. Saxon Charters and Field Names of Gloucestershire. Council of BGAS.

GUIDO M. 1978. The Glass Beads of the Prehistoric and Roman Periods in Britain and Ireland. Reports of the Research Committee - Society of Antiquaries No.XXXV. London, 53-56, 77-78.

HALE MB & MOORE LP. 1970. Trans. WNFC.

HARRIS F. 1936. Trans. BGAS, 58, 283-284.

HARRIS F. 1937. Trans. BGAS, 59, 327.

HART CE. 1966. Royal Forest. Oxford University Press, 74.

HART CE. 1967. Archaeology in Dean. Bellows, Gloucester, 7, 39-40.

HART CE. 1971. The Industrial History of Dean. David & Charles, 329.

HART CE. 1983. Coleford. Alan Sutton, 50.

HART CE. 1987. Trans.of The Regard of the Forest of Dene 1282. FoD LHS reprint.

HASELGROVE C. 1977. Supplementary Gazetteer of Find Spots of Celtic Coins in Britain. Occasional Paper No.11a, University of London - Institute of Archaeology, 129.

HASSALL M. 1980. Authors, Curses and Other Epigraphic Evidence in RODWELL W. (Ed) Temples, Churches and Religion in Roman Britain, BAR Brit. ser. 77, 82.

HASSALL M. 1987. Roman Gloucester in Perspective. Glevensis 21, 5-6.

HAWKES CFC. 1961 in CLIFFORD EM. Bagendon - A Belgic Oppidum. Cambridge, 43-47.

HEIGHWAY C. 1984. in SAVILLE A (Ed) Archaeology in Gloucestershire. Cheltenham Museum, 235.

HENIG M. 1984. Religion in Roman Britain. London, 135.

HEYS FG & THOMAS MJ, 1963. Excavations on the Defences of the Romano-British Town at Kenchester. Trans.WNFC Vol.XXXVII, 2, 149-178.

HURST H. 1988 in WEBSTER G.(Ed) Fortress into City. Batsford, 48-73.

JACK GH. 1923. Excavations on the Site of Ariconium. Trans.WNFC, 1-47.

JARRETT MG. 1969. The Roman Frontier in Wales. Revision of Nash-Williams VE.

JOBEY G. 1959. Archaeologia Aeliana Vol.37, 217-278.

JOBEY G. 1968. Archaeologia Aeliana Vol.46, 293-295.

JOHNS B. 1989. The Charcoal Hearth Sites of Blakeney Hill Woodlands. The New Regard No.5. FoD LHS, 40-46.

JOHNSON BLC. 1953. New Light on the Iron Industry of the Forest of Dean. Trans. BGAS Vol.LXXII, 135.

JONES B & MATTINGLY D. 1990. An Atlas of Roman Britain. Blackwell, Oxford, 194-196 & 292-294.

KENYON R & REECE R. 1985 in Hurst HR, Kingsholm. Glos. Arch. Pubs, 22-26.

KING RJ. 1990. Dean Archaeology 3. DAG, 30.

LEWIS N & REINHOLD M. 1966. (Ed) Roman Civilization. Sourcebook II: The Empire. Harper & Row. New York.

MANNING WH. 1981. Usk: The Fortress Excavations 1968-71. Univ. of Wales Press, Cardiff, 40-43.

MANNING WH. 1985 Inchtuthil - The Iron Objects in Pitts LF & St. Joseph JK. Alan Sutton, 289-299.

MANNING WH. 1985. Catalogue of the Romano-British Iron Tools, Fittings and Weapons in the British Museum.

MANNING WH. 1988. Early Roman Campaigns in the South West of Britain - The First Annual Caerleon Lecture 1987. National Museum of Wales, Cardiff, 25-26.

MARGARY ID. 1967. Roman Roads in Britain. Constable, London.

McDONNELL JG. 1986/87 in KNIGHT D. An Iron Age Hill Fort at Castle Yard, Farthingstone, Northants. Northamptonshire Archaeology, 21, 31-39.

McWHIRR A. 1981. Roman Gloucestershire. Alan Sutton, 105.

McWHIRR A. 1988, Cirencester in Webster G (Ed), Fortress Into City, Batsford, 74-90.

MEGAH JVS & SIMPSON DDA 1981 (Ed) Introduction to British Prehistory. Leicester University Press, 412-413.

MYNOR RAB. 1964 (Ed) PANEGYRIC LATINI VETERES (XII PANEGYRICI LATINI).

NASH-WILLIAMS VE. 1939. A New Roman Mining Site At Lower Machen, Monmouthshire. Archaeologia Cambrensis, 94, 108-110.

NASH-WILLIAMS VE. 1939. An Early Iron Age Coastal Camp at Sudbrook. Archaeologia Cambrensis, 94, 42-79.

NASH-WILLIAMS VE. 1969. The Roman Frontier in Wales revised by Jarrett MG. Univ. Wales Press, Cardiff.

NICHOLLS Rev.HG. 1858. The Forest of Dean; An Historical and Descriptive Account. John Murray, London, 5.

NICHOLLS Rev.HG. 1866. Iron Making in the Olden Times. New Edition published by D.McLean at Coleford, Glos.1981.

ORMEROD Dr.G. 1860, Strigulensia, 43.

- PEDDIE J. 1987. Invasion - The Roman Conquest of Britain. Alan Sutton. Gloucester, 154-156.
- PEPYS Samuel. 1952. Diaries. Edition by WHEATLEY HB. Vol.II. G.Bell & Sons. London, 245.
- PRICE A. 1991. A Smithing Hearth From East Dean. New Regard 7, FoD LHS, 51-53.
- PULLINGER J. 1990. The Roman Villa at Boughspring. Excavation Report. Dean Archaeology 3. DAG, 12-25.
- RACKHAM O. 1986. The History of the Countryside. Dent.
- REECE R. 1987. Coinage in Roman Britain. Seaby, London 36-38.
- RHODES JF. 1974. The Oldcroft Hoard of Bronze Coins and Silver Objects. Numismatic Chronicle Vol.XIV, 65-75.
- RICHARDSON L. 1964. The River Severn between Upper Arley (Worcs.) and Gloucester, its general geology, navigation, bygone fords and alluvial deposits. Worcester, 3-4.
- RIVET ALF & SMITH C. 1979. The Place-Names of Roman Britain. Batsford, 262-265.
- ROSTOVITZEFF M. 1957. The Social and Economic History of the Roman Empire. Oxford, 110.
- RUDDER S. 1779. A New History of Gloucestershire, 562.
- SALWAY P. 1984. Roman Britain. Oxford University Press.
- SAVORY HN. 1976. Some Welsh Late Bronze Age Hoards - Old and New. Archaeologia Atlantica 1.2, 122.
- SCOTT-GARRETT C & HARRIS FH. 1938. Chesters Roman Villa, Woolaston, Glos. Archaeologia Cambrensis 93, 93-125.
- SCOTT-GARRETT C. 1956. Romano-British Sites at Chestnuts Hill and Popes Hill, Forest of Dean. Trans. BGAS, 199-202.
- SCOTT-GARRETT C. 1959. Roman Iron Mine in Lydney Park. Trans.BGAS Vol.78, 86-91.
- SIBLY TF. 1927. Special Reports on the Mineral Resources of Great Britain Vol.X. Iron Ores - The Haematites of the Forest of Dean and South Wales. HMSO. London, 1-59.
- SINDREY G. 1990. Roman Dean. DAG Occasional Publication No.1, 28-29.
- STANDING LJ. 1985. The New Regard No.1. FoD LHS, 37-38.



- STANDING IJ. 1986. The New Regard No.2. FoD LHS, 62.
- STANDING IJ. 1987. The New Regard No.3. FoD LHS, 85.
- STANDING IJ & TYLECOTE RF. 1977. The Drummer Boy Stone. Journal Hist. Met. Soc. Vol.11 No.2, 84-85.
- STANFORD SC. 1974. Croft Ambrey Excavations. Leominster.
- STANFORD SC. 1980. The Archaeology of the Welsh Marches. Collins. London, 116.
- STANFORD SC. 1981. Midsummer Hill, an Iron Age Hillfort on the Malverns. Leominster.
- STEVENS BJ. 1965. Navigation on the Wye. Memorials of Monmouth No.5. (Monmouth).
- STRABO. 1923. Loeb Edition.
- SUETONIUS. 1967. The Twelve Caesars. Penguin Classics. 1967 Ed.
- TACITUS. 1948. Agricola. Trans. by Mattingly H. Penguin Classics.
- TACITUS. 1977. The Annals of Imperial Rome. Trans. by M.Grant. Penguin Classics 1977 Edition.
- TAYLOR E. 1986. Herefordshire Archaeological News. WNFC, 1-2.
- TIMBY J. 1990. Severn Valley Wares: A Reassessment. Britannia XXI, 243-251.
- TOMLIN R. 1989. Monmouth. Britannia 20, 343 (61).
- TOMLIN R. 1990. Cunovendus, A Second Century Iron-Worker from Blestium. Dean Archaeology 3. DAG.
- TROTTER FM. 1942 (Reprinted 1964). Geology of the Forest of Dean Coal and Iron Ore Field. HMSO, London.
- TYLECOTE RF, AUSTIN JN & WRAITH AE. 1971. The Mechanism of the Bloomery Process in Shaft Furnaces. J.Iron & Steel Inst., 209, 342-364, Fig.32 Table XIII.
- TYLECOTE RF. 1985. Analysis of a Lump of Dross from the Forest of Dean. (Personal Comm).
- TYLECOTE RF. 1986. The Prehistory of Metallurgy in the British Isles. The Institute of Metals, London, 131-142, 156-162.

TYLECOTE RF. 1977 in BRANIGAN K. Gatcombe - The Excavation and study of a Romano-British villa estate. BAR Reports 44, 125-126.

WACHER J. 1978. Roman Britain. J.M.Dent.

WALTERS B. 1985, The New Regard No.1. FoD LHS, 31-33.

WALTERS B. 1986. The New Regard No.2. FoD LHS, 58.

WALTERS B. 1987. The New Regard No.3. FoD LHS, 59, 77-78.

WALTERS B. 1988. Roman and Medieval Excavation in Monmouth. Glendower Street School. Dean Archaeology 1. DAG, 3-28.

WALTERS B. 1989 May. DAG Newsletter Vol.2 No.1.

WALTERS B. 1990. A Major New Roman-Period Industrial Settlement Near Newent, West Gloucs. Dean Archaeology 3. DAG, 26-29.

WALTERS B. 1990. Dolocindo ? Dean Archaeology 3. DAG, 29.

WALTERS B. 1990 in SINDREY G. Roman Dean. DAG.

WALTERS B. 1992. The Archaeology and History of Ancient Dean and the Wye Valley. Thornhill, 43-108.

WALTERS B. (forthcoming) Ariconium. A DAG Monograph.

WALTERS B & M. 1987. Excavation of a Romano-British Iron Smelting Shaft Furnace At Barnfield, Eastbach Court, FoD. The New Regard No.3. FoD LHS, 50-53.

WALTERS B & M. 1989. Ariconium Military Site Excavation. Interim Report. Dean Archaeology 2. DAG, 32-45.

WALTERS HB. 1908. The Victorian County History of Hereford.I.

WALTERS M. 1990. Rescue Excavations on the Occupation Site at Legg House, Blakeney, Forest of Dean. Dean Archaeology 3. DAG, 40-44.

WALTERS M. 1991. A New Roman Coin Hoard from the Forest of Dean: Oldcroft 2. Dean Archaeology No.4 DAG, 4-15.

WALTERS M. 1992. Excavations on the Roman Occupation Site at Legg House, Blakeney (2nd Interim Report 1991/92). Dean Archaeology 5. DAG, 4-11.

ATKIN WT. 1877. Roman Herefordshire. Archaeological Journal Vol.XXXIV, 358-366.

WEBSTER G. 1981. Rome Against Caratacus. Batsford, 116, 160.

WEBSTER G. 1986. The British Celts and their Gods under Rome. Batsford, 55-56, 70-71, 134.

WEBSTER G. 1988. WROXETER in Fortress into City. Batsford, 120-143.

WEBSTER G. 1990. A Late Celtic Sword-Belt with a Ring and Button Found at Coleford, Gloucestershire. Britannia Vol.XXI, 294-295.

WHEELER REM & TV. 1932. Report on the Excavation of the Prehistoric, Roman and Post-Roman Site in Lydney Park, Glos. Reports of the Research Committee of the Society of Antiquaries of London No.IX.

WIGHTMAN EM. 1985. Gallia Belgica. Batsford.

WILDGOOSE P. 1988. Surface Mining of Iron Ore at Wigpool, Forest of Dean. The New Regard No.4. FoD LHS, 4-11.

WILLIAMS V. 1988. Analysis of 'Roman' Coal from Monmouth, Glendower Street School Excavation. Dean Archaeology 1. DAG, 10-11.

WRIGHT RP. 1985. A Revised Restoration of the Inscription on the Mosaic Pavement Found in the Temple at Lydney Park, Gloucestershire. Britannia 16, 248-249.

WRIGHT T. 1854. Wanderings of an Antiquary, 23-28.

WYRRAL G. 1877/78. Observations on the Iron Cinders Found in the Forest of Dean and its Neighbourhood. Trans. BGAS, Vol.2, 225-226.

YARRANTON A. 1677. England's Improvement on Land and Sea.

ZOSIMUS. 1887. Historia Nova Ed. L.Mendelssohn (Leipzig 1887). English version by Buchanan JJ & Davis HT, 1967.

## INDEX

Abbotswood 32.  
Agricola 73, 74.  
Ariconium/Bury Hill (Weston-under-Penyard) 23, 24, 25, 36, 42, 43, 45-50, 52, 57, 65, 72, 77-79, 89, 93, 98, 99, 110, 127, 133, 140-142, 149, 151.  
Aston Ingham 1, 54.  
Awre 1, 120.  
Aylburton 145.  
Bailey Point 11.  
Barnfield (Hangerbury) 5, 56, 113.  
Bearse (The) 117, 118, 126, 149.  
Berry Hill 64.  
Bishopswood 123.  
Blackpool Bridge 23, 142.  
Blakeney 1, 67-70, 96, 120, 142, 148, 149, 151.  
Blakeney Hill Woods 37.  
Blooms (iron) Bars/Billets 5, 6, 8, 113, 114.  
Boughspring 20, 85, 106, 117, 119, 123, 124, 149, 151.  
Bream Scowles 23, 33, 105.  
Broom Hill 19.  
Bryn-y-Castell 40.  
Bulley Bench Wood 2.  
Caerleon 51, 67, 73, 100.  
Caerwent (Venta Silurum) 76, 91.  
Castlefield 8, 45, 51, 151.  
Cefn Pwll-Du 70.  
Celtic Coins 43, 44.  
Celtic Warrior Burial 3, 107.  
Chepstow 138, 141.  
Cherry Orchard 20.  
Chesters Villa (Woolaston) 27, 36, 37, 85, 89, 105, 117, 119, 123, 124, 127, 135, 145, 148, 149, 151.  
Cinderbury 23, 53, 64.  
Cinder Field 14.  
Cinder Ford 2, 142.  
Cinder Hill 2, 6, 78, 104.  
Cirencester (Corinium Dobunorum) 76, 91.  
Clearwell (Caves) 17, 33.  
Coal 3, 60, 64.  
Coalpit Hill 3, 64.  
Coleford 2, 42, 64, 72, 89, 93, 96, 105-108, 111, 119-121, 125, 127, 135, 142, 148-153.  
Collafield 9.  
Courtfield (Welsh Bicknor) 126.  
Cowmeadow Farm 6, 38, 114.  
Crabtree Hill 2.  
Crawwell West 40.  
Cunovendus 79.  
Cursus Publicus 70.  
Dean Road 10, 23, 45, 52, 69, 123, 140, 142.

Delves (The) 11.  
Dobunni 76.  
Doward 34, 62, 64, 81, 138.  
Draethen 71.  
Drybrook 4, 32, 38, 54, 142.  
Drummer Boy Stone 19.  
Dyfrig 126.  
Edgehills 9, 12, 32, 38.  
English Bicknor 5, 143.  
Exeter 66.  
Farthingstone 39.  
Frocester Villa 122, 128, 145.  
Furnace (Shaft) 5, 36, 52, 56, 77, 105.  
Furnace (Bowl) 36, 44.  
Gatcombe 145.  
Gloucester (Glevum/Colonia) 45, 51, 66, 69, 70, 75, 76, 91, 136, 137, 140, 141, 145, 146.  
Great Crumbland 22, 63, 72.  
Great Howle 22, 53.  
Gwenherryon Farm 23, 62, 72.  
Hadnock 14, 88, 106, 117, 146, 149, 151.  
Hadrian's Wall 91, 92.  
Hangerbury Hill 5, 34, 38, 113, 120.  
Hentland 7, 80.  
High Nash 2, 42, 106-108, 111, 121, 135.  
High Woolaston 123.  
Horse Pill 27, 28, 65.  
Horse Shoes 108.  
Huckhoe 39.  
Hunsbury 40.  
Huntley 7, 54.  
Huntsham 6, 87, 106, 117, 149, 151.  
Hurst Farm 64.  
Hygga 21, 63, 72.  
Imperial Estates 67, 146, 147-150.  
Inchtuthil 56, 57, 74.  
Kenchester 91, 138.  
Kentchurch 8, 45, 151.  
Kidnalls 23.  
Kingsholm 45, 48.  
Lambsquay Wood 17, 34.  
Lea Bailey 141.  
Lead Mines 46, 70.  
Lining Wood 11.  
Littledean 8, 38, 142.  
Littledean Hall 8, 114, 122, 124, 152.  
Llangarron 9, 63, 80.  
Llanwarne 10.  
Llyn Fawr 40.  
Lord's Wood 26, 62, 81.  
Lower Lydbrook 6, 88, 142.  
Lower Machen 70.  
Lower Monkton 10, 62, 72.  
Lydney 10, 64, 70, 96, 105, 140-146, 149.

Lydney Park 10, 33, 42, 105, 114, 115, 124, 150, 152.  
Mendips 46.  
Midsummer Hill 41.  
Mitcheldean 11, 45, 46, 142.  
Monmouth (Blestium) 2, 12, 13, 36, 51, 58-61, 64, 65, 72, 78-80, 82, 93, 96, 98, 99, 104, 106, 111, 127, 141, 143, 146, 149-151.  
Newent 15, 16, 82-84, 96, 98, 99, 102-104, 127, 133, 149.  
Newnham 69, 140, 142, 143.  
Nibley 142.  
Noxon 17, 18, 33, 105.  
Oldcroft 10, 123.  
Overmonnow 13, 14, 36, 93, 96, 100, 104, 106, 111, 119, 127, 152.  
Oxenhall 18.  
Panbrook 9.  
Parkend 23, 143.  
Park Farm (Lydney) 10, 84, 85, 105, 117, 146, 149.  
Perrygrove 17, 34, 105.  
Peterstow 18, 63.  
Pill House 20.  
Popes Hill 8, 88, 104, 106, 127, 149, 151.  
Redbrook 142.  
Round Hill 7.  
Ruardean 18, 53, 142.  
Scowles Village 3, 34, 105.  
Scully Grove 11.  
Sedbury 20.  
Silures 45, 51, 67, 75.  
Silverstone Farm 11.  
Soudley 32, 69, 141.  
Spears 1, 46, 48, 49.  
St. Weonards 19, 63.  
Staunton 18, 34, 38, 143.  
Stock Farm/Wood 17, 34, 87, 89, 106, 116, 148, 149, 151.  
Sudbrook 11, 41, 45, 48, 141, 150.  
Sword 4, 42.  
Symonds Yat 6, 55, 64, 87, 150.  
Taloche Farm 12, 60, 61.  
Tre-Addow 7, 81.  
Trellech 21, 63, 64, 151.  
Tretire 22, 80.  
Usk (Burrium) 48, 51, 61, 66.  
Wallingstones 9.  
Warfield 15.  
Weald (The) 56, 74, 91, 92, 97, 99, 144.  
Welshbury 1, 88, 141.  
Welsh Newton 23, 62, 80, 81, 82.  
Welshpool 136, 137.  
Whitchurch 25, 26, 62, 80, 81, 96-98, 127, 151.  
Whitescourt 1.  
Wigpool 11, 32, 46, 52, 69, 82, 94, 99, 152.  
Wilderness Farm 11, 12, 32.  
Wonastow 12.  
Worcester 91, 94, 128, 144.  
Wroxeter 66, 90, 91.